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THE OCEAN

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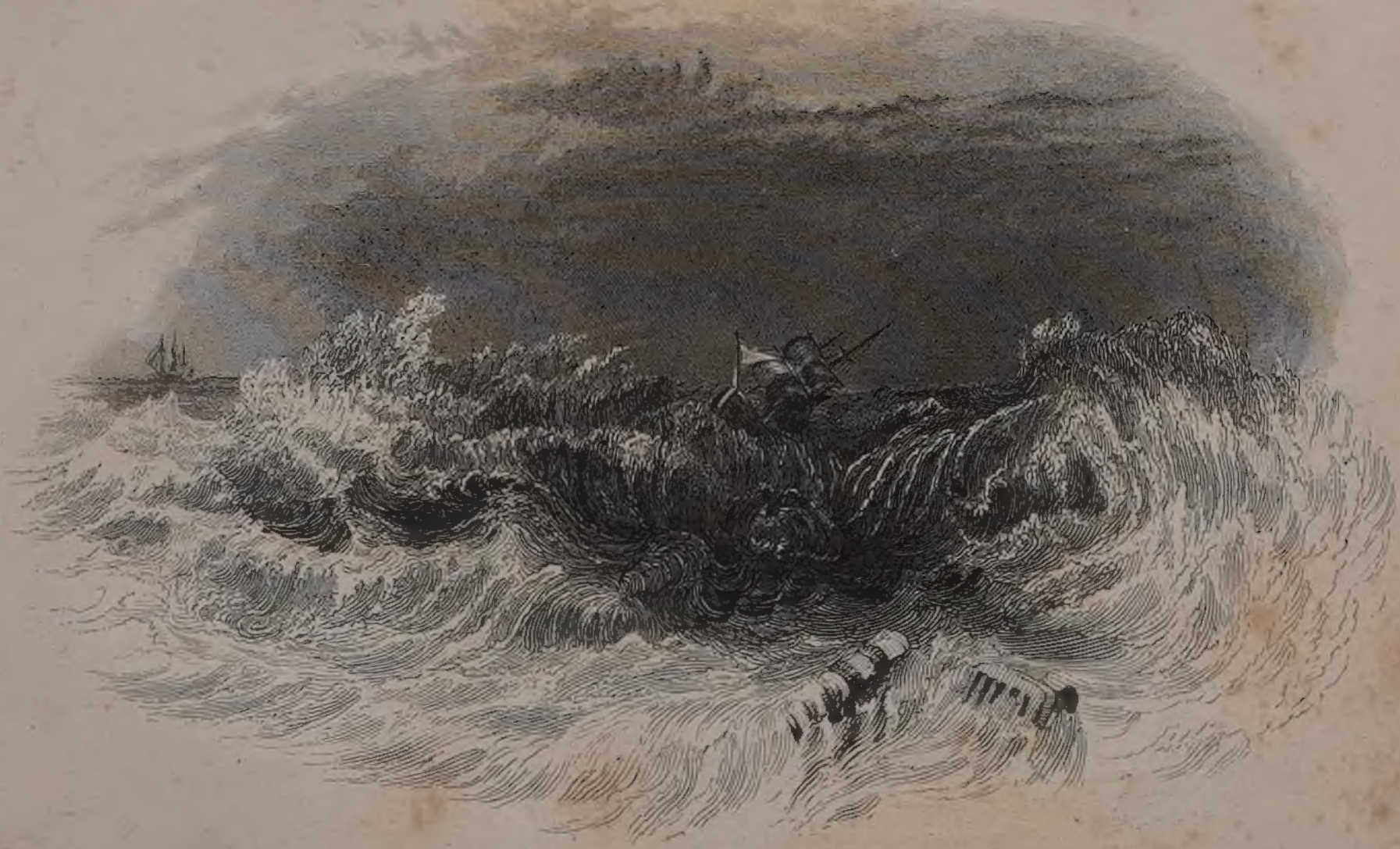

Appearances of the Ocean.

A WHIRLPOOL.

Pub.d July 1833 by John Harris St.Pauls Church Y.d

THE OCEAN;

A DESCRIPTION OF

WONDERS AND IMPORTANT PRODUCTS

OF

THE SEA.

"Hail! thou inexhaustible source of wonder and contemplation!
Hail! thou multitudinous Ocean!"

KEATE.

SECOND EDITION.

WITH ADDITIONAL ENGRAVINGS OF THIRTY-SEVEN GENERA OF SHELLS.

LONDON:
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THE OCEAN.

CHAPTER I.

GENERAL DESCRIPTION.

COME! let us leave awhile the breezy hills, the wooded vales, and the richly-varied forms of an inland view, that we may behold Nature arrayed in her vast, flowing vesture, THE OCEAN. Shall we say that she is less beautiful, interesting, or grand, wrapt in that darkly sparkling robe?—Surely not. The eye and the mind have here a boundless expanse, for admiration, for contemplation, and inquiry:

let us not therefore content ourselves, even in early life, with ignorance and indifference regarding this, or any other considerable portion of the visible creation, merely because it does not lie so constantly under our own observation as some other things.

The Ocean occupies much more than half the surface of our globe, and this fact is, perhaps, the first of its *wonders* which we ought to notice. Human wisdom might have been satisfied with a few gushing fountains, and mountain streams, for the use of creatures; but it seemed fit to the Creator that water should not only thus appear, but form an expanse reaching from continent to continent, from pole to pole,—water, a gliding, yielding body, refusing to sustain the foot of man—affording no fields for culture, and mocking or aggravating his thirst by its bitter, briny

flood. Scorning his dominion, the Ocean invades the shore at times, and removes all vestiges of human power and labour, and not unfrequently returns, as in derision, the sad remains of those who have too confidently ventured on its wild domain. Yet we are quite sure that the Ocean, so far from being an enemy or an evil, is productive of the most important benefits to mankind.

By the *Ocean* we understand that vast collection of waters which, notwithstanding the extensive continents and innumerable islands of the world, is in fact *connected* from east to west, and from north to south; so that vessels can sail progressively, and at length reach the point from which they first proceeded. *Seas* are, properly speaking, those parts of the Ocean which, washing particular shores, are thence named. These portions of

the Ocean, form the gulfs, bays, straits, and channels of our maps. It has been computed that the earth is invested with more than eighty-five millions of square miles of water! an extent which I am sure our minds cannot really comprehend. Now, supposing that the general depth of the Ocean is a quarter of a mile (and it is probably more), the quantity of water in the whole is equal to twenty-two millions of *cubic* miles; that is, it would fill twenty-two millions of cisterns, every one a mile wide each way, and a mile in depth!

Many of my readers have, I doubt not, visited the sea-coast in the summer months, and think themselves authorised to say that they have "*seen the sea.*" It would, however, be more correct to say, that they have viewed an incomparably small part of it. We will suppose, that in a nobleman's grounds there is a

piece of water of irregular shape, but one or two miles in breadth and length, and that a party of ants had made their way along a few yards of a gravel walk towards its rippling edge. They creep down to some minute projection, whereon a few of them can stand and bathe their slender limbs,—how much, think you, of that extensive lake can these insects be said to *see*, from the best *watering-place they* can select?—Not more probably than could be covered by a burdock leaf! Yet *their* prospect would be far more extensive in proportion, than our view of the sea even from a mountain; because the lake may be considered a *plain, flat* surface; but the Ocean has the general globular form of the earth; and thus it is evident that the eye must always be confined within the horizon line.

It is quite certain, indeed, that neither our calculations at home, nor our actual survey from any part of the coast, can instruct us duly, so as to enable us to form a just conception of the dimensions of the Ocean; and I am not sure that those who spend their lives upon it, and traverse for months together its undivided expanse, are always impressed with more suitable ideas of its sublime extent.

We are all too apt to judge of things rather by what we see, than by what may easily be known respecting them. Thus the size of the earth itself is strangely misconceived by persons who are sufficiently inquisitive and lively in their imaginations on other subjects. Those, however, who wish to enlarge their minds, will find it very advantageous to bring them continually to the employment of view-

ing the works of Nature, with a strong endeavour to *comprehend them as they are.* This effort will expand the thoughts, and raise them above the trifles with which too many persons are all their lives engaged.

And what is the next cause of wonder connected with the Ocean? Here are millions of square miles of water—surely the appropriate question now must be, *what sort of water is it?* Is it nearly tasteless, like that of our lakes and rivers, or has it any quality of a peculiar kind? Yes,—this inconceivable mass of water is *seasoned with salt!* This, I dare say, is no news to any of my readers. They have heard long since of "the briny wave," and have perhaps so considered the subject, as to perceive nothing more surprising in this fact than in the sweetness of a

cup of tea! Well, then, we will suppose the sea to be *flavoured with sugar!* Now we *all* begin to wonder whence such vast quantities of that palatable ingredient could be derived as must be required to flavour even so much water as we can see from the shore. All the sugar that was ever made by man we may well suppose insufficient for that purpose. Where then, let me ask, does the *salt* come from which mixes with the sea that covers half the globe? The minds of philosophers have been very much occupied with this subject. Some have supposed that mountains and plains of salt exist beneath the Ocean; but of this we have no proof.

We are better able to conjecture the *reason and use* of the saltness of the sea than the cause of it; for there is no doubt that it is thus preserved from many of the noxious

changes common to other water: besides this, the salt in the sea prevents its being frozen, or encumbered with ice, except in the very coldest regions.

Mariners are thus at liberty to navigate the Ocean in nearly all parts where commerce would lead them. But, as salt water is unfit for drinking, being highly injurious as well as nauseous when taken in considerable quantities, they are compelled to take water with them, even when borne on the ample main!

The want of fresh water is nearly as dreadful a calamity as the privation of food. Various expedients, therefore, are resorted to when the supply from the casks falls short. Cloths are spread to catch the rain or dew; sea-water is sometimes boiled with certain ingredients, and the steam collected in drops. It is only when thirst becomes ungovernably

severe that sailors will drink the sea-water, knowing that by so doing death will speedily ensue.

The general appearance of the sea varies much with the circumstances under which it is seen. It is never otherwise than grand, "whether viewed when every wind is hushed, —when the morning sun silvers the level line of the horizon, or when his evening track is marked with flaming gold,—whether we behold it in its terrors, when the black tempest sweeps its swelling billows, and the boiling surge mingles with the clouds—when death rides the storm, and humanity drops a fruitless tear for the toiling mariner whose heart is sinking with dismay!" The usual colour of sea-water is a pale bluish green; but a sudden gust of wind, the presence of a cloud, the reflection of the sky, and the kinds of ani-

mal and vegetable productions with which it may abound, as well as the nature of the bottom, give almost every other hue that can be named.

But there is a peculiar luminousness of the sea at times which is extremely remarkable. Those who have been spectators of the sea by night have seldom failed to remark its brightness then. In some places it shines as far as the eye can reach, at other times only when the waves boom against the sides of the vessel, or the oar dashes into the water. Some seas shine often, others more seldom; some when particular winds blow, and others in a narrower compass.

Captain Bonnycastle, whilst sailing up the gulf of St. Lawrence, on the 7th of September 1826, observed this appearance in a most surprising degree. At two o'clock in the

morning the mate aroused the captain in great alarm. The night was starlight, but suddenly the sky became overcast in a certain direction, and a rapid, instantaneous, and very brilliant light, resembling the Aurora Borealis, shot out of the hitherto gloomy and dark sea, and was so vivid as to light every thing even to the mast-head. The mate having alarmed the master, put the helm down, took in sail, and called all hands up. The light now spread over the whole sea between the two shores, and the waves which before had been tranquil began to be agitated.

Captain Bonnycastle describes the appearance as that of a blazing sheet of awful light. The oldest sailors had never seen anything of the kind to compare with it, except the captain, who said that he had before wit-

nessed a similar appearance. The light showed plainly numbers of very large fish, darting about as if in consternation at the scene. Day broke very slowly, and the sun rose of a fiery and threatening aspect. The captain caused a bucket of this shining water to be drawn up: it was one mass of light when stirred by the hand. A portion of the water kept in an open jug preserved its luminous quality in some degree for several days.

It is not very easy to account for so amazing a circumstance; but it is thought that this radiance is either caused by myriads of little animals, which, like the glow-worm, emit light from their bodies, or that it arises from some phosphoric matter, like that which shines from mackerel and other fish when viewed at night. It is an opinion held by sailors, that

the luminousness of the sea is a forerunner of stormy weather.

It is however probable, that no appearances at the surface of the sea equal those which its hidden depths and unfathomed bottom would reveal, if disclosed to the eager, inquiring eye of man. Much has been ventured, and something has been accomplished, towards satisfying our curiosity respecting *submarine* affairs; and a machine, called *a diving-bell,* has been invented, in which persons desirous of so very retired a walk as that at the bottom of the sea may to a certain extent be accommodated.

The nature of this contrivance will be perfectly understood by an experiment which any one can perform. If we place a piece of cork on the surface of a basin of water, and then invert over it a glass tumbler, it is possible, by sinking the glass steadily down, to sink

also the cork, without at all wetting its upper surface; nor would the result be different if we were to continue plunging the glass many feet under water. The air within it would, although somewhat compressed, preserve a space free from water, so that a fly standing upon the cork would be in no danger of

drowning; any breathing animal, however, would speedily require a change of air, without which suffocation would ensue. If instead of a cork, half a walnut-shell be used, the proof will perhaps be more satisfactory, for it may be forced down under a glass as far as the arm can reach into a deep tub of water, but not a drop will have entered the little boat.

Diving-bells have been made large enough to contain five persons; some in the *form* of bells, others square, like a chest. Dr. Cothodon descended in one of this kind in the year 1821. It was cast in one piece of metal; the upper side, or roof, had several round windows, formed of very strong glass well fitted in. A pipe descended from the surface of the water, through which fresh air was forced by a pump worked above. Dr. Cotho-

don says, "We were lowered so slowly, that we did not notice the motion of the bell until it was immersed in the water, when we felt about the ears and forehead a sense of pressure; my companion suffered so much that we were obliged to stop our descent for some time. At length we descended again, when my companion's face turned pale; his lips were particularly discoloured; his appearance was that of a man on the point of fainting. For myself, I experienced a strong pressure round my head like that of an iron crown, but was not otherwise much affected. I found that my voice, however, was scarcely audible to myself, though I spoke as loudly as possible."

The pressure experienced by these persons in the bell may be thus explained:—The water, of course, would have risen into the bell and

filled it completely, had it not been for the air contained in that machine, which could not escape. The effort, however, of the water from beneath was so powerful as to force the air into a much smaller space than it would otherwise occupy, and it was this compressed air which also compressed the persons within, and was felt most about the head and ears. One who had put paper balls in his ears, had them forced so far into his head when descending, that they were with great difficulty extracted by a surgeon!

Dr. Halley, who went down in a diving-machine for scientific purposes, tells us that he proceeded to the depth of fifty fathoms, or three hundred feet. When the sea was clear and the sun shone, he could see perfectly well to write and read, and of course to take up anything below. At other times, when the

water was troubled and thick, it was as dark as night, and he was obliged to light a candle ;—*a candle, remember,* A LIGHT *at the bottom of the sea!* Perhaps you will remark, however, that it is no more surprising that a candle should burn there, than that a man should there breathe, and read and write at his leisure. The air within must keep the water out, or neither could exist. It is remarkable that the sea, which above appears of a greenish hue, when looked upon from below, was of a deep red colour, casting a light upon objects of a reddish tinge. The reason is, that the red rays of light alone can penetrate those depths. Lower still, it is probable that these also cease, and there is total darkness.

We learn from divers in general, that, whilst the surface of the ocean is wrought into rage by the wind, there is usually a complete calm

below. It is found, too, that the sea is colder as we descend, so that at great depths the cold is intolerable.

As diving-bells are rather inconvenient travelling carriages, the excursions made in them at the bottom of the sea have not been very numerous or extensive. They have been chiefly used for the recovery of goods from sunken vessels, and for the examination of the beds of rivers, when works have been there required for piers and bridges. A diving-bell was employed in the Thames to give the means of ascertaining the nature of the aperture through which the water so unfortunately rushed into the Tunnel below.

There is another fact which, perhaps, some of my readers would not be prepared to expect in the great depths of the Ocean. It is this, that heavy bodies, which will sink rapidly from

the surface, do at length apparently cease to descend, long before they have reached the bottom; the pressure of the water being such as to cause them to remain suspended at certain depths, varying in proportion to their weights. Thus it is that the plumb-line will not act beyond a certain length; and we have no means, of course, of extending our inquiries deeper. We know not, indeed, *how many miles* the Ocean may be in depth at those parts which are thus unfathomable!

It is quite certain that the Ocean is spread over a surface very much resembling in form that of the land. There are mountains, valleys, plains, hills, ridges, precipices, caverns, and grottoes below water, as well as above. Many islands with which the Ocean is studded are plainly mountain tops, which the water has not covered. The unfathomable places are,

no doubt, valleys or fissures, or deeply sunken plains; whilst the shoals and shallows near shore are but the approaches to those eminences which, rising above the water, we call "*the land.*"

The polar regions present the sea to view in forms totally different from those which it assumes elsewhere. It is there occupied with mountains and moving plains of ice, whose magnitude exceeds that of many islands which have a name upon our maps as important tracts of land. These tremendous floats sometimes rise more than a thousand feet above the surface of the water; sometimes extending many leagues in undivided length, but frequently following in chains for two or three hundred miles together. The flat, or driving ice, is much more terrible to mariners than that which rises in lumps; for a ship can avoid these

Appearances of the Ocean

FROZEN SEA

last, as being discovered from a distance; but it is liable to get unexpectedly entangled amongst the other masses, which, closing, may either detain the vessel till the crew perishes with hunger, or speedily crush it to atoms.

The mountain ice is generally of a pale green colour, but occasionally it is grey or blackish. It is found to be mixed with earth, stones, and brush-wood washed from shore. On these are frequently found nests with birds' eggs, though hundreds of miles from land. These floating ice-bergs have no doubt attained gradually the height of mountains by encrusted snows and sleet, frozen from time to time, and some of them may very likely be as old as the world itself! We shall have occasion to notice the icy seas again before our account of the Ocean will be completed.

CHAPTER II.

MOTIONS OF THE SEA, AND THEIR EFFECTS.

THERE is reason to believe, that if the Ocean were always perfectly tranquil, it would, notwithstanding its saltness, soon become a corrupt mass of waters, fatal to the whole race of beings now enjoying existence in the world. Mariners have, indeed, actually observed this tendency, even in sea-water, to become tainted and highly noxious during a comparative calm of a few days.

The movements and changes of the sea therefore are, we may say, needful and incessant. They may be described as tides and currents; as the effect of winds — from the smallest ripple of the surface to the tempest

Appearance of the Piratical

A CALM

raising the sea in masses "mountains high." Then there are whirlpools, waterspouts, quakings of the earth at the bottom of the sea, and the changes constantly produced by the vast evaporation from its surface, and the return of water into it from the clouds and rivers.

The sea, too, not unfrequently exchanges portions of domain with the land; retiring in some places, advancing suddenly in others, and sometimes giving new islands to our view. We must notice these particulars separately.

What do you think of *the tides?* What would you say if you were to perceive that the pond in your garden had risen several feet within a few hours, had overflowed some of its banks, and again retired from others; and that this rising and falling, ebbing and

flowing, kept time accurately with the clock! Would you be contented to observe such a fact, or to hear of it as occurring in another place? No; you would endeavour if possible to account for it; and, if unable, you would eagerly seek some explanation from others.

Now the tides of the Ocean differ only from the circumstance I have supposed, in being infinitely vast in their appearances and effects. Instead of the spoonful of water contained in a garden lake, here are the rolling waters which cover half the globe subjected to a regular influence, by which they go and come by an unseen but constantly acting power! The sea is observed to flow for certain hours from the south towards the north, in which motion, or flux, as it is called, which lasts about six hours, the sea gradually swells; so that, entering the mouths of rivers, it drives

back the river waters towards their heads or springs.

Thus it is at London-bridge. The Thames, which would otherwise pass constantly towards the Nore, is periodically obliged to return. After a continual flow of six hours, the sea seems to rest for about a quarter of an hour, after which it begins to *ebb*, or retire, for six hours more, in which time the water sinking, the rivers resume their natural course. Then, after a seeming pause of a quarter of an hour, the sea again begins to flow; and thus alternately. So the sea ebbs twice a day and flows as often, but not exactly at the same hours, for the period of a flow and ebb is twelve hours and rather more than three quarters, so that the tides return later each day by that portion of an hour.

To what power or influence are we to attribute this surprising and regular motion of the sea? There are no winds thus blowing to account for it. "Twelve hours and forty-eight minutes"—let us consider. The earth turns round once in twenty-four hours exactly; therefore, we cannot make that circumstance agree with the tides as to time. What other motion is there which corresponds? Surely we have it in the periods of the moon! Yes, twelve hours and forty-eight minutes make *a lunar day exactly;* that is, the moon passes the same apparent place in the heavens, later and later each day, by forty-eight minutes. This we know then, that the moon and the ocean observe punctually each other's usual times; and it is further observable, that the tides vary in degree and effect, according to the vary-

ing positions of the moon. It would be impossible, therefore, to suppose that the moon had no influence on the sea, even if there were nothing in nature beyond this agreement to guide our reason. But the fact is, that the same principle or law of nature which causes our own bodies to have *weight*, and to tend toward the earth, clearly shows us that the moon, like the earth, is an attracting substance, and draws even those things towards herself, which are as far from her as the seas of our world!

It is evident, however, that water is the only material which is at liberty to move and show this influence; and the waters do in fact rise to a certain extent under the moon's attraction, and are thus led from place to place as the earth revolves. The sun, also, though at such an inconceivable distance, has some

effect; and when it happens that the sun and moon act in the same direction, the tides are the greatest.

The Mediterranean, the Black Sea, and other waters surrounded nearly by land, do not exhibit the tides, of course, in so great a degree as the great oceans of the world. The ancients, therefore, who had not travelled from those shores, were scarcely aware of the flow and reflow of which we have been speaking. How great, then, must have been the surprise of Alexander's soldiers, when at the mouth of the river Indus they beheld its waters rising and falling thirty feet in a few hours! They felt, as we are told, a mixture of curiosity and apprehension. It is in wide-mouthed rivers, opening in the direction of the current of the tide, that the effect is generally most conspicuous. At Chepstow, in Monmouthshire,

is observed the extraordinary circumstance of the tide rising frequently sixty feet perpendicularly, which is the highest flood of the kind in any part of Europe.

Then there are motions of the sea of another kind, called *currents*. These are found to run in all directions, east, west, north, and south, being occasioned by various causes; the prominences of the shores, the narrowness of straits, the variations of the wind, and the inequalities of the bottom. Currents are very often highly deceptive and dangerous to mariners; they carry them sometimes insensibly from their intended course, and perhaps irresistibly bear them on to the very rocks which they know must prove their destruction. Along the coasts of Guinea, if a vessel overshoots the entrance of a river to which it is bound, the current prevents its return; so that it is

obliged to steer out to sea, and perform a great circuit to regain the point thus lost.

But the most remarkable currents are those continually flowing into the Mediterranean, through the Straits of Gibraltar, and from the Euxine sea by the Archipelago. Besides the waters thus derived, this sea receives numerous and large rivers, as the Nile, the Rhone, and the Po; and yet it neither delivers at any known outlet, nor does it rise and overflow its banks. This has long been a wonder to many. How such a vast concourse of waters is disposed of, we cannot yet explain: it is supposed, however, that there are undercurrents, leading out, in some parts; and, perhaps, subterranean passages in others. There is a story told of an Arabian, who caught a dolphin in the Mediterranean, and, having marked it by a ring of iron, he let it

go again. Some time after this, a dolphin was taken in the Red Sea, and was quickly known by the same ring. Perhaps, however, it will be safest to place little reliance on a tale of this kind, and to content ourselves with conjectures, the most reasonable that occur.

A current of the most dreadful kind is that which circulates round some central point, and forms a funnel-shaped cavity in the sea, leading to an unknown abyss below. This is called a whirlpool; and if our mariners were not now pretty well aware of the nature and situation of eddies of this kind, they would frequently perish in them. The whirlpool on the coast of Norway is considered the most awful in the world. This is called Maelstrom. The body of waters that form it are extended in a circle above thirteen miles in circumference. In the midst stands a rock, against

which the tide at its ebb is dashed with great fury. At this time it instantly swallows up all that comes within the sphere of its violence, trees, timber, and shipping. No skill in the mariner, no strength of rowing, can work an escape: the sailor at the helm finds the ship go at first in a direction opposite to his intentions; his vessel's motion, though slow at the beginning, becomes every moment more rapid; it moves round in circles still narrower and narrower, till at last it is whirled against the rocks, and instantly disappears; nor is it seen again until, perhaps, six hours afterwards, when, the tide flowing, it is sometimes cast forth with the same violence with which it was drawn in! Any sea animals coming within the influence of this dreadful whirlpool are unable to avoid its fury, and various instances are recorded of

their struggling, roaring, and bellowing, in a frightful manner when approaching its vortex, showing that they are sensible of their danger. The same happens frequently to bears, who attempt to swim to the neighbouring island to prey upon the sheep. It is said that the noise of this circling rush of waters resembles roaring thunder, and thus it is altogether one of the most tremendous things in nature.

We have said that, the situation and extent of these dangers being known, our sailors are able generally to avoid them. But with regard to the *irregular* motions of the sea, caused by tempests and storms of wind, they are not confined to times and places, and often overtake the mariner when he least expects them. The power of wind, which can uproot forests, and remove the most substantial buildings, we may well suppose to be

tremendous when expended on the yielding waves of a vast ocean. Mountains of water are then driven onward upon each other, and awful gulfs are ploughed in the roaring main by the mere force of the irresistible air, until the stoutest hearts are appalled, and words are entirely unable to represent the scene. During this fury of the blast, the masts, sails, and rigging of ships are frequently torn away; the vessel is thrown upon its side or its end, and its escape seems little less than a miracle to the crew.

But storms, even the most violent, are not so much dreaded when, as navigators say, there is plenty of *sea-room;* that is, when the ocean is free from rocks, reefs, shoals, and shores, so that the vessel is in no danger of being dashed against them, or lodged upon them. A ship may be reared to the giddy summit of

Mr. Thomas Hill. Aetat. 1

a wave at one moment, and be sent to the lowest depth of the watery valley at the next; nay, she may be almost whelmed in the foaming surge, and yet survive the storm, because she encounters no solid unyielding substance. But when she descends with her whole weight upon a rock, or is so fixed herself as to become an obstacle to the waves, her destruction is sure and speedy. Rocks, or reefs of rocks, under water, are the occasion of the greater number of shipwrecks of which we read. I shall present my readers here with an account connected with a narrative of the kind, and which cannot fail to interest them.

The Bounty was a vessel sent many years ago to the South Seas by the English Government, to obtain plants of the bread-fruit tree from Otaheite, which were to be taken to the West Indies, for the use of our colonies there.

The trees were duly procured, and the vessel was proceeding on her voyage, when part of the crew mutinied, forced the captain and eighteen men into a small open boat, and left them to their fate.

The weight of these persons, with that of the few articles they were permitted to take, brought down the boat so near to the water, as to endanger her sinking with a moderate swell of the sea. The nearest land at which they could expect assistance was almost four thousand five hundred miles distant; and during the time requisite to accomplish that voyage, their provisions would not exceed one ounce of bread and a quarter of a pint of water a day each man, with occasionally a very small shred of pork, and a tea-spoonful of rum! So severely scanty was this allowance, and so dreadful the sufferings of these unfortunate men, through

fatigue and exposure to the weather, that it seemed unreasonable to suppose that they could survive the voyage. Small birds, which were sometimes caught by the hand, were divided strictly into nineteen portions, and eaten with avidity raw. The crew did, however, reach safely Timor, one of the numerous islands of the Eastern sea, where they found the most humane attention from the people of the European settlement, and means were provided for the return of the crew to England.

In the mean time the mutineers had established themselves in some of the Society Islands, but they were not even there out of the reach of British law. Part of the crew of the Bounty having arrived in London; they laid their complaint before the Government, by whom another vessel, called the Pandora, was sent out for the purpose of finding the muti-

neers, and bringing them home for punishment. This voyage was almost as disastrous as that of the Bounty, though from a different cause. The captain, indeed, succeeded in taking fourteen of the criminals, but his own vessel encountered shipwreck on her return, which cost the lives of many.

A reef is a chain of rocks lying near the surface of the water. The barrier reef on the eastern coast of New Holland is a chain of extraordinary extent and danger. On the arrival of the Pandora near this spot, a boat was sent out to search for an opening, which was soon discovered; but in the night the vessel had drifted past it, and before they could be prepared, she struck upon the reef, and presently struck again with such violence, as to cause a leak, which nearly filled the hold in a short time. Notwithstanding the

pumps, the water gained rapidly upon the crew, and in this state the vessel moved from the reef upon deep water. It soon appeared evident that the Pandora must go down. The ship's boats therefore were got ready, a few articles of food and clothing were thrown into them, and ninety-nine persons thus saved their lives; but thirty-one of the ship's company, and four mutineers, perished with the vessel, which sunk so far that only her topmast appeared above the water!

The currents are usually very strong in the vicinity of these reefs, and thus vessels are likely to be forced upon them. Another occurrence at sea, far more surprising and awful, though less frequent, is that of a *spout*, or water-spout, by which shipping may be instantaneously destroyed. Its first appearance is usually in form of a deep cloud, white

above and dark below. From the lower part of this cloud hangs, or rather falls down, a portion like a tube or column, tapering as it descends. Under this there is always a great boiling and flying up of the sea, which in fact ascends in the form of a column, to meet that

from the cloud. The whole pillar then has a swift whirling motion, and sometimes occasions a noise like that of a mill. This continues until wind or some other cause breaks the column, when the water that had been drawn up descends suddenly with a force and in a quantity sufficient to sink any vessel unfortunate enough to receive it. Sailors, when they see a waterspout at a distance, sometimes discharge a gun at it, loaded with a bar of iron, by which the whole may be dispersed. The cause of this astonishing appearance has not been satisfactorily explained.

We must now notice those effects produced by extraordinary motions of the sea, which appear in the form of new lands, or of inundations and encroachments in various parts of the world. There is reason to believe, that if we could compare our present maps with the

forms of land and water which existed in the early ages of mankind, we should observe the lines of coast to have changed so considerably, that many seas and tracts of land would be sought for in vain. Earthquakes, we know, extend far under the ocean, and thus heave its very depths above the water; whilst in other places, from the same cause perhaps, the sea invades the shore for miles.

During the year 1831, a new island appeared suddenly near the coast of Sicily, which was very conspicuous from its height, and the volumes of steam and smoke that issued from it. It was, no doubt, the summit of a volcano or burning mountain, which had been upraised by some of those internal fires by which earthquakes are occasioned. However, it would have been a very undesirable possession, had its soil and form been the best

in the world; for, after a few months, it began gradually to sink, and is now some feet under water, and has become a dangerous shoal or shallow, of which mariners had need beware.

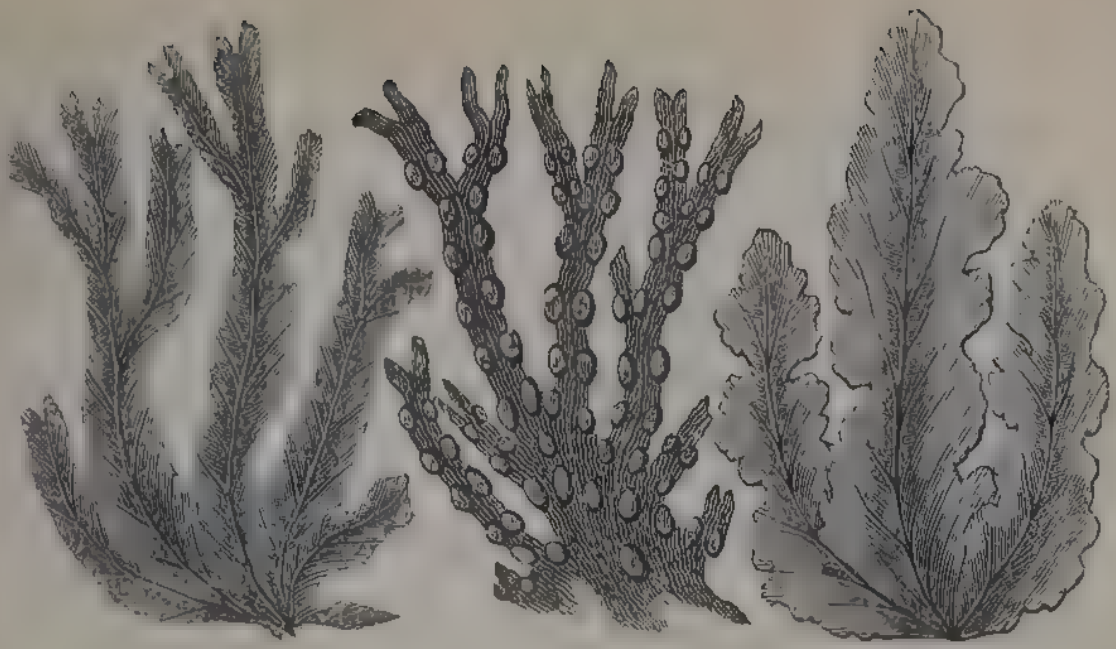
But there are large tracts of inhabited country, which have been gained from the retirement of the sea. The whole territory of Holland has been thus gained. The sea, however, would return and take possession, were it not that dikes or dams have been constructed with vast labour, by which the water is fenced off.

The surface of the earth there is indeed below the level of the sea, and persons approaching the coast look *down* upon it, as into a valley! Holland, however, seems rising from year to year by the soil brought thither by rivers and by human operations.

The invasions of the sea are the most dread-

ful of its movements to man. We have numerous instances of the sea's inundations, and of its burying whole provinces beneath its waves. Many countries thus destroyed have borne melancholy evidence to those facts of history, and have shown the tops of their houses and the spires of their steeples under water!

The vast estates of Earl Godwin, a Saxon nobleman, in Kent, were overflowed in the eleventh century, and now form what are called the Goodwin Sands. In the year 1546, a similar irruption destroyed a hundred thousand persons in the territory of Dort, and a yet greater number round Dullast. In Friesland and Zealand there were more than three hundred villages overwhelmed, and their remains a few years ago were visible at the bottom of the water in a clear day.



CHAPTER III.

SEA WEEDS.

It is not one of the least considerable wonders of the Ocean, that it produces a vast variety of forms and substances which perplex the minds of naturalists with the questions, Are they animal or vegetable bodies? —are they gifted with life?—are they *formed* by living creatures, or do they belong to a class properly between the one and the other?

If we examine the bottom of the sea along some shores, and particularly at the mouths of rivers, we shall find that it has the appearance of a forest of trees under water, millions of plants growing in various directions, with their branches entangled in each other, and sometimes standing so thick as to obstruct navigation.

The shores of the Persian Gulf, the greater part of the Red Sea, and the western coasts of America, are so choked up with coralline substances, that though ships force a passage through them, boats and swimmers scarcely find it possible to make their way. These aquatic groves consist of different things, and assume an inconceivable variety of appearances. The coral plants sometimes shoot out like trees without leaves; they often spread forth a broad surface, like a fan,

and not unfrequently a bushy head, like a fagot. Sometimes they resemble a plant with leaves and flowers, and often the antlers of a stag.

In other parts of the sea are seen sponges of various kinds, assuming sundry fantastic forms, like mushrooms, mitres, crowns, and vases. To even an attentive spectator these various productions seem entirely of a vegetable nature, and have been known to shoot out branches in the space of a year.

Philosophers, therefore, long thought themselves safe in ascribing these substances to the vegetable kingdom, and some have positively asserted, that these are marine plants, furnished with flowers and seeds like those on land. This opinion, however, has given way before numberless facts, which prove that corals and sponges are entirely the work

of animals, an infinite number of which unite their microscopic labours, until vast tracts of the Ocean become thereby occupied, and islands formed for the residence of man!

The reefs and banks so destructive to shipping very often consist of madrepore or coral formations. The prickly madrepore, which somewhat resembles coral, in parts of the southern regions is in extraordinary abundance, and forms immense beds at the bottom of the sea.

Captain Cook, and other navigators, have found these substances prevent their approach to land for several leagues. Many voyagers have mentioned the dangers to which they have been exposed during stormy weather upon coral reefs, not only from their liability to be wrecked by the ships driving against them, but also from the cables having been cut to pieces by rubbing against their rugged projections.

I suppose there is no need to describe coral to any of my readers: they must all be more or less acquainted with it, at least in a wrought state, as forming beads and other ornaments. It is, perhaps, the most valuable production of the sea, excepting pearls, and constitutes a very important article of commerce. Its natural appearance is that of a shrub without leaves, the stem being some-

times from three to six inches thick, and in most instances of a white colour. The interior of the substance is equal to marble in hardness.

The animals whose operations produce these vast and beautiful coralline structures are of the sort called the polypus, and are amongst the most curious objects with which Nature presents us. They are a little like worms, with a great number of feet or feelers proceeding from one end, but have often been mistaken for plants. When cut in pieces the parts grow and become so many distinct and perfect individuals.

To the inhabitants of Marseilles, Catalonia, and Corsica, the coral fishery is a very important pursuit. The parts of the Mediterranean from which coral is chiefly procured are, the coasts of Tunis and Sardinia, and the entrance of the Adriatic Sea.

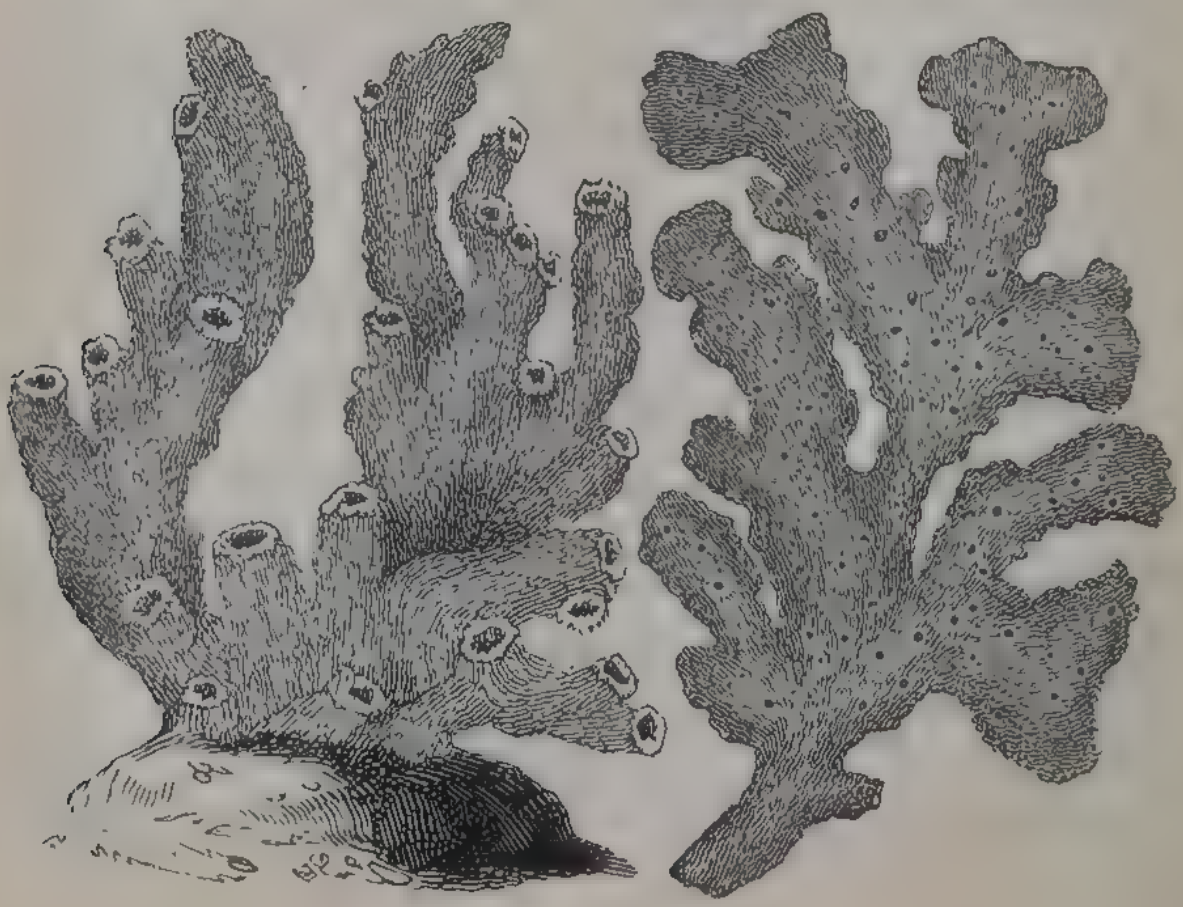
The British Government, a few years ago, concluded a treaty with the Barbary powers, for liberty to fish for coral in their waters. That which is thence obtained is conveyed principally to Malta and Sicily, where it is wrought into beads and other ornamental forms, and whence we afterwards import the commodity.

The mode of obtaining coral is by a very simple machine, consisting of two strong bars of wood or iron fixed across each other. These are loosely surrounded with twisted hemp. This apparatus, being sunk by a weight, is drawn along those rocks where the article sought is most abundant. Much of it becomes entangled in the cords, and thus is pulled up into the boats.

Coral is bought by weight. Beads of large size are worth about forty shillings an ounce,

whilst small ones do not sell for more than four. There are many beautiful pieces of sculpture in coral. Perhaps the finest specimens that are known are a chess-board and men in the palace of the Tuileries at Paris. The white species of coral, for ornamental purposes, is but little esteemed.

Sponge is likewise an animal substance,



found at the bottom of the sea in the Mediterranean. It is collected from rocks, in water about thirty feet deep, chiefly by divers, who become extremely expert in obtaining it. Its growth is so rapid that it is frequently found in perfection on rocks from which only two years before it had been entirely removed.

But the abysses of the Ocean yield substances of far more value than those we have mentioned, and which occupy a distinguished rank amongst the jewels even of crowns and sceptres. These are pearls, which are ready polished by the hand of Nature, and need no labour but that of removing them from their awful depths; an employment which is so severe and perilous as to give them an additional value.

Pearls are bodies nearly globular, which

are found in the shells of a sort of oyster or muscle. They are supposed to be occasioned by some disease or injury of the animal, which causes a kind of knot or protuberance. Shells which are pierced by worms, and otherwise punctured, are those that contain the pearls, which vary in size from that of a pin's head to a large nutmeg.

Pearls are found in various parts of the world, and some of considerable value have been taken from the British waters; but the Oriental pearls are those which are chiefly sought in commerce. A handsome necklace of pearls, smaller than peas, is worth from £170 to £300, whilst one of beads, not larger than pepper-corns, may not be worth more than £20. The King of Persia has a pearl valued at £110,000 sterling! Pearls from the seas of Ceylon are most prized in England.

There are two seasons of pearl-fishing in the East Indies — the first in March and April, the second in August and September. In the opening of the season there appear sometimes two hundred and fifty barks on the water, containing one or two divers each. As soon as the boats arrive at the place where the fish lie, each diver ties a large stone under him, to serve as ballast

below, also another weight is attached to one foot, whereby he is soon sunk to the bottom of the sea; each diver also carries down with him a large net, tied to his neck by a long cord, one end of which is retained in the boat. Thus the poor creature plunges sometimes to a depth of sixty feet. As he has no time to lose, he has no sooner gained the bottom, than he begins to run from side to side, sometimes on the sharp points of the rocks, tearing off the oysters he meets with and cramming them into his bag.

There is light enough always for the divers distinctly to see the shells they seek, and, to their consternation, they sometimes perceive monstrous fishes, from which their address in mudding the water will not always save them. Of all the perils of fishing this is one of the chief and most usual. The best divers,

it is said, will remain under water ten minutes, but the exertion, pain, and danger of this effort are extreme. When they are to rise, they pull the rope, by which those in the boats draw them up and empty the net-bag, which contains, if successful, five hundred, or perhaps not above fifty, oysters. These are laid in heaps, till the fish perish and the pearls drop out of the shells.

We must now take a little notice of the vegetable productions of the Ocean. Sea-weed is thrown on our shores by every tide, and much of it is exceedingly beautiful and curious in its appearance, though it can only be viewed in perfection when supported by its native element. The varieties of sea plants are very numerous. Many of them are known by naturalists under the general name of *fucus*. The botanists who accom-

panied Captain Cook discovered a sea-weed of an enormous size, which they therefore called *fugus giganteus.* The leaves of it were four feet long, and the stalks one hundred and twenty. They have since been found eight hundred feet in length.

The *polyschides,* or sea-hanger, is however the largest marine vegetable commonly seen, and grows ten feet in length. Its root is composed of several little hooks, all of which lay fast hold of the stone on which it is found. These hooks somewhat resemble the tendrils of the vine. The stalks are curiously twisted, and the leaves are divided into eight parts. These, which are very long, as the plant floats in water, give it very much the appearance of a piece of leather cut into several thongs.

Many sea plants are useful as well as beautiful. The *eringo,* or sea-holly, thrives on

sands which are plentifully watered by the sea. Its roots are candied by a particular process, said to be understood only at Colchester in Essex. Thus preserved, it is esteemed a sweetmeat, and has medicinal properties. The plant is thus described:

"The Eringo here
Sits as a queen among the scanty tribes
Of vegetable race. Around her neck
A gorgeous ruff of leaves, with snowy points,
Averts all rough intrusion. On her brow
She binds a crown of amethystine hue
Bristling with spicula, thick interwove
With clustering florets, whose light antlers dance
In the fresh breeze, like tiny topaz gems.
Here the sweet rose would die. But she imbibes
From arid sands and salt-sea dew-drops strength;
The native of the beach, by Nature formed
To dwell among the ruder elements."

The *bladder fucus* is a sea-weed of flat shape, and furnished with cells of air, by

which it is suspended. This is the commonest of all sea plants, and the most important, as from its ashes are made a substance called kelp, a kind of salt, used to a very great extent in the composition of glass and other manufactures. For the preparation of kelp, the plants of the bladder fucus are dried by the sun and air. They are then slowly consumed in a furnace sunk in the earth. When this receptacle is nearly filled with the remains of the burnt sea-weed, the whole is briskly stirred with a rake, or hook, till it assumes a shining consistence, like melted iron. In the Orkney Islands there is no process which so interests the inhabitants as the making of kelp; nearly three thousand tons of which are annually sent to market, at the rate of from £7 to £10 per ton.

The *winged fucus*, another species, is many

yards long, and is eaten in Scotland by men and cattle. So is the common *sweet fucus*, with which our shores abound. Another sort, the red *palmate fucus*, is exposed for sale in the markets of Edinburgh as an article of food. After having been washed in fresh water, it is eaten raw in salad, or by the poor boiled as a pot-herb.

Floating islands are not unfrequently formed by sea-weed and other plants, which become entangled together, and appear to voyagers like extensive fields. The *gulf-weed* of mariners swims about in masses several miles in extent—

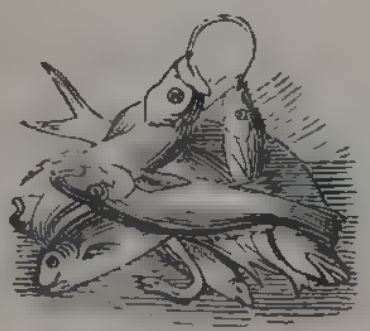
"Flung from the rock, on Ocean's foam to sail,
Where'er the surge may sweep, the tempest's breath prevail."

These moving islands sometimes originate from portions of plants and roots detached from the banks of rivers, which, falling into

the water, continue to vegetate and increase. The great American rivers, in the time of high floods, often carry down parts of their banks, covered with majestic trees; and these, meeting with others similarly swept off, unite, and form islands or rafts, which glide along with the stream, and perhaps carry destruction to the unwary sailor. "Woe (says Humboldt) to the canoes that during the night strike against these rafts of interwoven wood!" This celebrated traveller mentions, that when the Indians wish to surprise their enemies, they tie several boats together, and cover them with grass and branches to resemble these islands. Thus they succeed, perhaps, in bearing down upon their foes unawares.

The vegetable and other productions of the sea are perhaps as numerous and as various as those of the land; but they are chiefly

hidden from our knowledge by the element in which they exist. Naturalists, however, and other observers, have discovered enough, even amongst the weeds of the ocean and the living inhabitants of a few miles of sea, to fill volumes with the description of them. Our present little book can only contain a short account of such marine objects as are most remarkable in size, form, or other circumstances of peculiarity; and we will now turn our attention to a few of those surprising ANIMALS which glide beneath the wave, and people the recesses of the mighty deep.



CHAPTER IV.

MARINE ANIMALS.

ALTHOUGH the ocean is the grand receptacle of the animals called fishes, it must not be supposed that all the creatures residing therein are to be so called. The largest inhabitants of the deep are quite unlike fishes, and are classed by naturalists, from their resemblance to kinds, many of which dwell entirely on the land. Fishes generally, we may say, have gills, and always have *cold* blood; they have fins, but nothing in the shape of limbs. They have for the most part *scales*, and their eyes are without *lids*.

But we find that the cetaceous, or *whale* kind, have no gills, but breathe with lungs like our

own; they have warm blood, and have eyes like those of quadrupeds, and they suckle their young. Again, there are the seals and walruses, which, besides those particulars, are like land animals in having proper feet, though webbed, and being altogether destitute of fins. Then there are reptiles and insects; — amongst the former we find the most delicious food known to epicures, I mean the *turtle;* and with the latter, also, are species in high estimation at the table—these are lobsters and crabs, which, though called *fish* by many, are not so termed by naturalists, who arrange their subjects according to their real distinctions.

We will begin with what are called cetaceous animals, or those of the whale kind.

Here we have the *narwal,* or *sea unicorn, the great whale,* the *cachalot,* the *dolphin,* the *porpoise,* and the *grampus.*

The Narwal, when full grown, measures from twenty-five to thirty feet in length, exclusive of the surprising weapon which gives it the name of *unicorn*. This is a sort of tusk, six or eight feet long, and in substance resembling the ivory of the elephant. With so formidable an instrument, and with its prodigious strength, the narwal, if of a savage disposition, would be the terror of the northern ocean, but it seems in general to be sufficiently mild and peaceable. When attacked, however, it is

soon apparent that this tusk is no useless encumbrance. Urged with all the weight and power of the animal, it will penetrate even the solid timbers of a ship. It has occasionally been found broken short off in the bottoms of vessels; and even the largest whales taken have had this terrible tooth sticking fast in their bodies, which had not availed them against the mighty thrust of the rushing narwal.

These animals do not appear to have any organs of sound. They feed on small fish, of which they consume immense quantities: they accompany each other in troops. Like other cetaceous animals, they afford vast quantities of oil, for which, and for their flesh as food, they are pursued and taken.

THE GREAT WHALE.—This creature is not so called without reason, for it is supposed to be the largest of all living animals. It usually attains to the length of one hundred feet, and sometimes to nearly two hundred. It is plain that the largest of the land animals are inconsiderable in comparison with a bulk so enormous.

The general appearance of the whale may be learned from the engraving, but it is not easy to form an adequate idea of its magnitude without actually seeing it before us. The head of the whale is nearly a third of the whole bulk; the mouth is as large as a room of ordinary size, but the swallow is comparatively small, and the eyes are no larger than those of an ox. The skin is about an inch thick, and this encloses the fat, or blubber, which is about a foot in depth.

THE GREAT WHALE.

It is only with its tail that this vast creature advances itself in the water, the fins acting rather like rudders to assist in turning. Whales are naturally shy and timid. They avoid conflict and danger when they can, and with surprising swiftness long elude the chase of their enemies. As soon as they perceive the approach of a boat, they generally plunge, and sink far into the deep; but when, on rising for air, they find themselves in danger, they exhibit their tremendous strength. One blow with the tail will destroy a boat and its crew in a moment; and thus the narwal and others of its foes, though great in size, are sometimes conquered. Whales, in breathing, draw in a great quantity of water, and this they eject, from a sort of nostrils in the top of the head, to the height of forty feet or more.

The food of these animals consists of crabs and small fish, which they swallow in shoals, and whole, for they have no teeth; but the substance called whalebone is so disposed in plates within the mouth as to retain the food which enters.

As whales are so much larger than any other inhabitants of the Ocean, and as they do not molest each other, they have nothing to fear from superior strength, let them wander where they may. Their food is composed of animals comparatively minute; and the greater part of their successful enemies are apparently so small as to be beneath their notice. Amongst these none are so destructive to the whale as the hardy mariners of Britain and other countries, who repair to the Northern Seas at stated times in eager quest of their mighty prey.

The courage with which these adventurous spirits environ and lay siege to an animal equal, perhaps, to a thousand of themselves in bulk, is astonishing. Following in the wake or track of a whale, they tire him out at length, and plunge their harpoons in his back, causing the blood to flow in such abundance as to darken the water. The dying monster in vain spouts and plunges; his enemies retire but to return with renewed purposes of slaughter, and his vast body becomes in the end the prize of his relentless pursuers.

Every whale-ship sent out from this country carries with it six or seven boats, each of which has one harpooner, whose business it is to strike the whale; one man at the rudder, one man to manage the line, and four men as rowers. Each boat contains, besides two or three harpoons, several spears, and

about six lines, one hundred and twenty fathoms in length, fastened together. As soon as the men in the boat discover a whale, they approach and strike a harpoon as deeply as possible into his body. To this instrument the line is fastened, which, on the whale plunging, is allowed to run out, great care being taken to avoid any entanglement, which would probably upset the boat, and by continually mopping the wood to prevent it from taking fire by friction.

When the animal is despatched he is chained to the ship's side, the blubber is then cut out in square pieces, and the whalebone is extracted from the mouth. The tongue consists almost entirely of fat, and will alone yield five or six barrels of oil. The whole body of a whale full grown is supposed to weigh four hundred thousand pounds.

The Greenlanders and other northern people eat almost any part of the whale but his bones. The oil also they take as food in surprising quantities: it should be remembered, however, that when fresh this is entirely free from the unpleasant odour which it possesses when we obtain it.

The year 1814 was a singularly prosperous one to the British whale-fishery; seventy-six ships obtained one thousand four hundred and thirty-seven whales, besides seals, &c. In four years our vessels returned with five thousand and thirty whales, which produced fifty-four thousand five hundred and eight tons of oil, and two thousand six hundred and ninety-seven tons of whalebone. The following lines are beautifully descriptive, and allude to the scenes which we have been briefly noticing.

" Nature's strange work, vast whales of differing form,
Toss up the troubled floods, and are themselves a storm
Uncouth the sight, when they in dreadful play
Discharge their nostrils and refund a sea;
Or, angry, lash the foam with hideous sound,
And scatter all the watery dust around.
Fearless the fierce destructive monsters roll,
Ingulph the fish, and drive the flying shoal.
In deepest seas these living isles appear,
And deepest seas can scarce the pressure bear;
Their bulk would more than fill the shelving strait,
And fathom'd depths would yield beneath their weight."

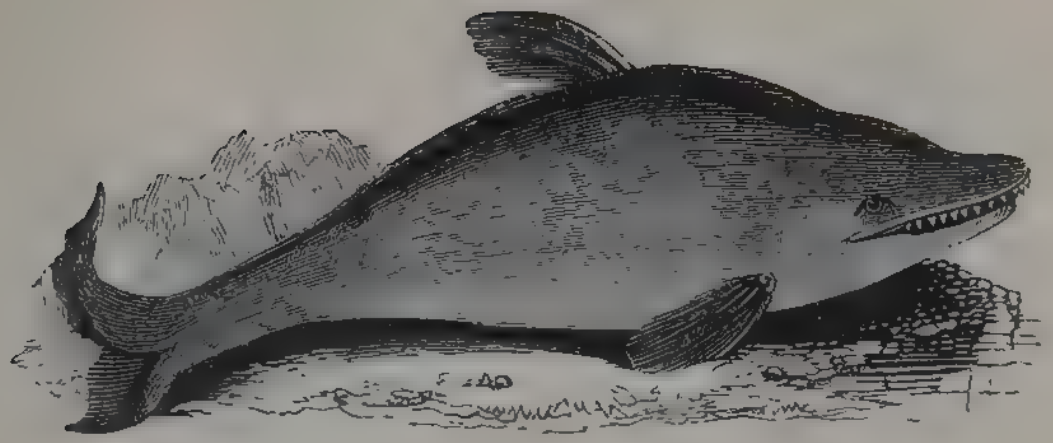
THE CACHALOT, OR SPERMACETI WHALE.—This is another vast creature of the cetaceous kind, but not so large as the whale. It is, however, sixty or seventy feet long, and above fifty in circumference. The head of the cachalot is even bigger in proportion than the whale's, and seems almost half his bulk. The under jaw has large teeth, and these are used by the animal with great effect.

Its activity in the water is truly astonishing, and indeed so great, that the whale-fishers have a constant dread of it, although the capture of a cachalot is the most profitable incident in their calling.

The valuable substances called spermaceti and ambergris are obtained from this animal, and also considerable quantities of the best oil for lamps. The spermaceti is found in a cavity of the head, which is sometimes eighteen feet in length. Spermaceti, however, is not the brain, but an oil which, during the life of the cachalot, is in a fluid state. It afterwards hardens to a white substance, and is much used for candles and as a medicine. A quantity of this article sufficient to fill eighteen butts is frequently obtained from one animal.

These creatures generally swim in nume-

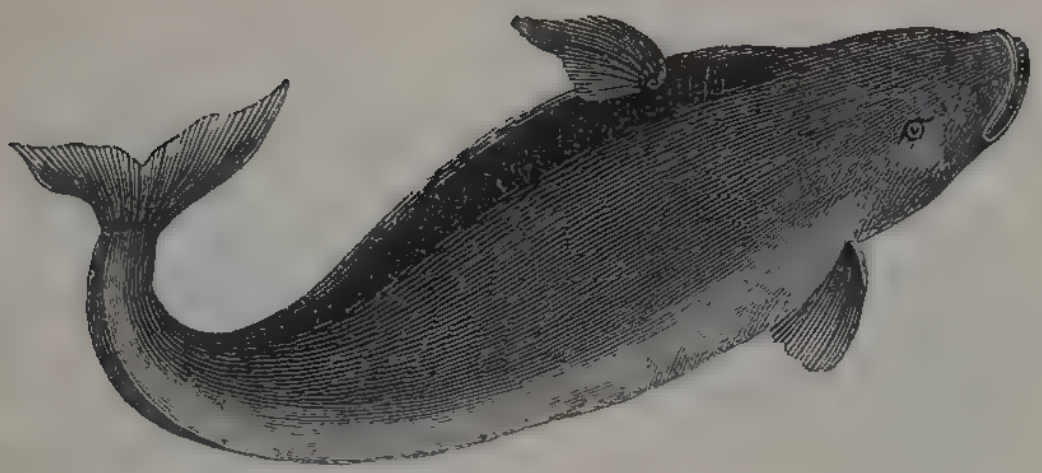
rous companies. In the year 1784, thirty-two were cast on the French coast. Their bellowing was heard some miles off. Persons who happened to be near at the time, unable to conjecture the occasion of what they heard and saw, were thrown into the utmost agitation and alarm. These whales were all young, but measured from thirty to fifty feet in length. They were not able to regain the sea, but continued alive for twenty-four hours, floundering in the shallow water, scattering the sand and mud in all directions, and throwing columns of water to a surprising height. The cachalots are exceedingly voracious, and are dreaded even by the shark.



THE DOLPHIN.—This animal has had the fortune to obtain considerable celebrity amongst mankind, and has become a sort of symbol of the watery tribes. The ancients believed that dolphins were partial to the human race, and even supposed them to assist in conveying shipwrecked mariners to the shore, for which imaginary service they were consecrated to the gods. The lively gambols of dolphins on the wave, their undulating motions, and the interesting spec-

tacle occasioned by the sports of shoals of them together, afford a grateful amusement to the crews of vessels, to whom so little is presented to vary the sameness of their view.

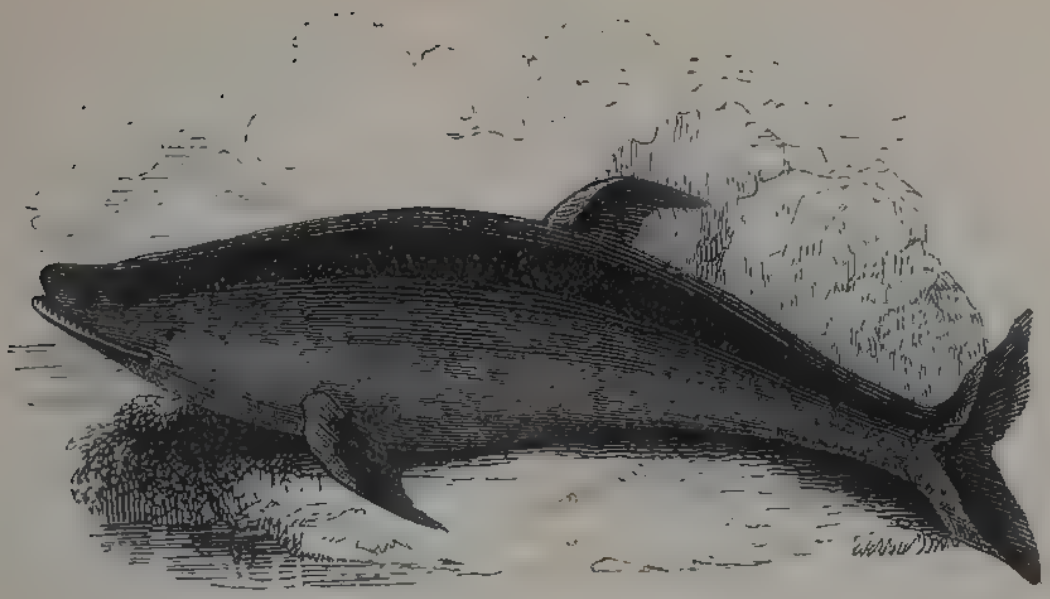
The dolphin is usually depicted crooked, and it is true that he frequently assumes that form, although at other times as straight as other creatures. It is a cetaceous animal, nine or ten feet in length, with a row of large teeth in each jaw, and a single orifice near the top of the head. The body is black, with a bluish tinge above, and white below. Dolphins range at large in nearly every part of the ocean.



THE PORPOISE, though nearly allied to the dolphin in form and nature, does not at all partake of the good name which the latter has acquired. On the contrary, he is commonly known by the epithet of *sea-hog*; yet his voraciousness is not much more remarkable than that of the honoured species last described. This variety of the cetaceous kinds is six or seven feet in length, has a somewhat conical body, a row of teeth in

each jaw, and a short and blunt head, in the top of which is a single breathing-hole.

The porpoise yields a considerable portion of excellent oil, *when caught,* but he is so extremely unwilling to obtrude his good qualities upon the world, that he seldom is in the way of being praised. In fact, the trouble of taking porpoises is too great in general to be repaid. Their flesh was formerly esteemed as food, but we now neglect it. They feed on herrings and other small fish; are common in the Atlantic and Northern Seas, and are frequently seen from our shores.



THE GRAMPUS is one of the cetaceous animals, and a most deadly foe to the whale. Its length is more than twenty feet, and it possesses much strength and more agility. This creature attacks the largest whales. Great flocks fasten round them like bull-dogs, and make their vast victim bellow like thunder with the pain of the encounter. These animals are not taken without the greatest difficulty. They are seen at the surface of

the water but for a moment, and easily elude the usual means of capture. When, however, their eager pursuit of prey brings them into shallow water, they are more easily despatched.

We should observe, that the attachment of the whale kinds generally to their young is extreme. The great whale, when hardest pressed, will retain its offspring beneath its fins; and there is a story related of a grampus, which, with her cub, had ventured too far upon an inlet of the sea, so as to be nearly deserted by the tide. In this situation the animals were discovered from the shore, and wounded until the sea was dyed with their blood. The old one at length forced herself safely into deep water, but, anxious to save her young one, she returned, and thereby shared its fate!

This enormous quadruped is a scarcely less surprising object than the whale. The engraving gives some idea of its marvellous bulk and uncouth form. It has short fin-like feet, and two prodigious tusks projecting downward from the upper jaw. Walruses inhabit the sea near the northern coast of America, and feed on sea-weed, corallines, and shell fish. They are nearly eighteen feet in length, and ten or

twelve in circumference. Their skin is covered thinly with dark brown hair. They have small eyes, and mere orifices for ears.

Now, what do you think of the walrus from what you see and read? Would you like to encounter one as an enemy? The power of this animal is indeed enormous, but happily his disposition is peaceful and inoffensive. It is chiefly when they are attacked that they become dangerous, though occasionally they will overturn boats, apparently in mere wantonness and frolic.

In the year 1766 some of the crew of a sloop were in this way placed in great danger by a number of walruses, and notwithstanding the utmost exertions of the men to keep them off, one more daring than the rest got into the vessel over the stern, and, after looking at the people for some time, again plunged into the

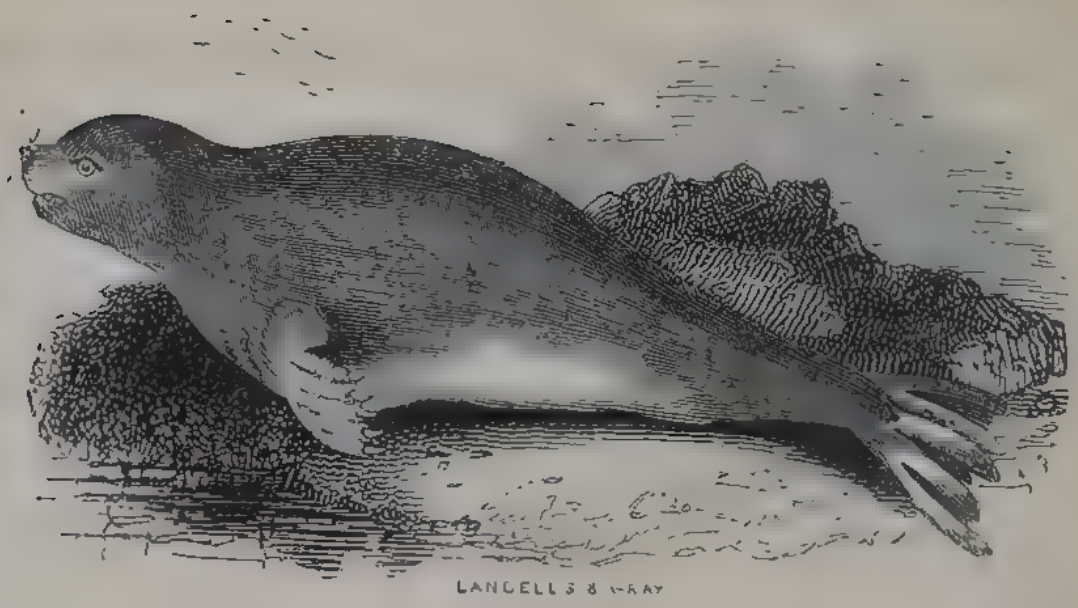
water to his companions. At the same instant another of enormous size was getting in over the bow, and would probably have succeeded, and sunk the sloop, had not the man placed there seasonably taken up a gun and discharged its contents down the creature's throat! The people had only time to reach the shore before a whole troop of walruses arrived with the design, as it evidently appeared, of avenging the death of their companion. The attachment of these animals to their young, and to each other generally, is very remarkable; and it is therefore a matter of no small hazard to attack one of their number.

Captain Cook thus describes a herd of walruses discovered on an island of ice on the northern coast of America. "They lie," he tells us, "in herds of many hundreds on the ice, huddling on each other like swine; and

roar or bray so very loud, that in the night, or foggy weather, they gave us notice of the vicinity of the ice before we could see it. We never found all asleep, some being always on the watch. These, on the approach of the boat, would wake those next them, and the alarm thus given would gradually rouse the whole company; but they were seldom in haste to depart till after they had been once fired at. Then they would tumble over each other into the sea in the utmost confusion; and if we did not at the first discharge kill those we fired at, we generally lost them, though mortally wounded. They did not appear to us to be that dangerous kind of animal which some writers have described; they are more so in appearance than reality. The female will defend her young to the very last, and at the expense of her own life, whether in

the water or on the ice; nor will the young one quit the dam though she be dead, so that if one be killed the other is certain prey."

It seems that as long ago as the reign of Alfred these creatures were known to the English; they were then called *horse-whales,* and were taken for their teeth, bones, oil, and skins. There are other specimens of morse, as the *whale-tailed manaté,* the *round-tailed manaté,* and the *sea-ape manaté,* which vary in size and other particulars.



These animals are not very much unlike the last we have been describing. Like them they inhabit the waters chiefly, but are able to live on land, and indeed do resort very much to the shore, and in great numbers during the summer months.

The seal resembles a quadruped in some respects and a fish in others. The head is round like that of a cat, the nose broad; the teeth also resemble those of the cat tribe, and hence they are classed with them by Linneus.

The eyes of seals in general are large; they have no external ears, but holes serving the purpose. The neck is well proportioned, and the body thickest where it joins it. Thence its form tapers to the tail, and here it is much like a fish. The whole body is covered with a shining hair, which looks as if rubbed with oil. The feet of the seal are remarkable, and puzzling to a young naturalist, for they seem to be more like fins than anything else; but then they have claws, which remind us of some of the four-footed race. The fore feet are very much confined under the skin, and the hinder still more so; indeed, they are hardly discernible there as limbs. The dimensions of seals vary from four to six feet in length, and there are other differences of form and colour which distinguish several species.

Seals are found on almost all the northern shores of Britain, and also in the arctic

regions, and are eagerly pursued. The flesh is much esteemed by the Greenlanders, and their skins are very valuable, being made into coverings for their tents, clothing, and bedding, casings for their boats, and thongs and straps of various kinds. The Americans blow the skins full of air and make rafts of them by that means. The fat, fibres, bones, and intestines are all used by the needy inhabitants of the North; nor do we disdain to avail ourselves of the seal—his skin, fur, and oil, form to us important articles of commerce.

As the chief food of the seals is fish, they are sufficiently alert and clever in procuring it. In places where herrings are seen in shoals, the seals frequent and destroy them by thousands. When the herrings retire, seals are compelled to seek a less easy prey; but, being very swift divers, they are enabled

to supply their wants pretty well. Smaller fishes have no other resort than the shallower waters. The seal has been seen to pursue a mullet, which is a rapid swimmer, and to hunt it to and fro in the deep water as a dog would a hare. The mullet, after trying every art of evasion, was observed to betake itself to shallow water, thither, however, the seal followed, so that the unfortunate little fish had no other expedient than to throw itself on its side, by which means it could proceed in still shallower water than before; and thus it at last got free.

The seals are very bold and courageous also on shores thinly peopled. If attacked here with stones, they bite such as are thrown against them; and if encountered more closely, they make a desperate resistance. They usually sleep soundly when they consider

themselves secure, and then it is that the hunters endeavour to surprise them. If shot at but not much hurt, they hasten towards the sea, flinging stones and mud behind them as they scramble along, and at the same time uttering the most piteous cries.

There is a kind called by some voyagers the *sea-lion.* It is much larger than the others, and measures sometimes eighteen feet in length. It is extremely fat, and is therefore a valuable prize. This animal has a mane round the neck like the quadruped whose name it shares. A man who resided some days on Behring's Island was surrounded by seals of this kind. They soon became reconciled to him, would observe with great composure what he was doing, and even suffer him to lay hold of and play with their young. They are found principally on the eastern shores of Kamtschatka.

CHAPTER V.

FISHES.

NATURALISTS have observed and given names to about four hundred different kinds of fishes, these being such as have so far ventured from the hidden depths of the sea as to come under the eye of man. There may be four hundred or four thousand more, far beneath the wave, which may or may not be revealed in time. Of those of which we know something, we can only describe satisfactorily a few; the habits and nature of the greater part being still unknown.

Naturalists (and such I should like my young readers to be) observe much wisdom and design in the structure of fishes, and their

conformation for the element in which they are to reside. Their bodies are clothed and guarded in the best manner with scales, or something as complete for their occasions, suitable to their respective circumstances, the dangers they are exposed to, and the business they have to perform. The centre of gravity, or that point of the body on which the whole might be exactly balanced, is placed in the fittest part for swimming, whilst the shape is the most commodious that could be devised, according to geometrical rules, for making a progress through the fluid that supports them.

Their instruments of motion are fins, or *fans*, which give them considerable velocity, assisted materially, and directed by the tail. Most of them, also, are furnished with an air-bladder, by compressing or dilating which they

sink or rise at pleasure. Their eyes are peculiarly adapted to the varied manner in which light pervades the water at different depths, and they greatly resemble those of birds. But perhaps the most remarkable parts of fishes are the gills, placed on each side the neck, by which they breathe. In doing this they fill the mouth with water, and then throw it backwards, so as to open the flaps which cover them.

Now, it may not possibly be known to all my young readers, that water contains a considerable portion of true air, and it is the office of the gills of fishes to extract this for the purposes of their respiration. From the gills, the air finds its way into the body of the fish; and without this air, so obtained, they would speedily die; for, being destitute of lungs, they cannot long breathe out of water.

It was formerly thought that fishes were des-

situte of the organs of hearing, but it is now pretty generally admitted that they possess these advantages, and it is well known that water is capable of transmitting sound.

Fishes are in general *oviparous;* that is, they produce eggs, many millions of which have been ascertained to exist in the roe of a single cod! If, therefore, fishes did not prey largely on each other, it is plain that the ocean, vast as it is, would by no means contain them; but whilst shoals are produced, shoals are consumed, and thus room is made for every kind. Fish, though subject to innumerable dangers from their own tribes and from man, are naturally long-lived animals, and exist, it is said, in some instances one or two centuries. We will name a few of those inhabitants of the ocean, which are most remarkable in nature, size, or form.

THE CONGER EEL.—There is something in the form of the eel that reminds us strongly of the serpent tribe; at the same time its fins and gills plainly liken it to fishes; so that eels in general seem to occupy a place which connects them partly with both. When at its full size, the conger eel has been known to measure ten feet in length. It is a hazardous prize when hooked, and our British fishermen often

find it so to their cost. Congers will entwine themselves round the men's legs, and fight with desperate fierceness for their lives. An incident of this kind occurred some time since near Yarmouth: the animal rose half its height, and knocked the man down who had taken it before he could kill it. It weighed about sixty pounds, but some exceed a hundred weight.

These creatures are enormously voracious, and, concealed in the mud, they lie in wait for any prey that may pass. If too large to be immediately devoured or overcome, it is said that the conger will coil himself round his victim, and thus detain it till his teeth can take effect. Congers are found on the British shores in various parts. The Cornish fishers in Mount's Bay have sometimes sent ten tons weight of dried congers to Spain and Portu-

gal. They are taken chiefly with lines, five hundred feet in length, and having sixty hooks. These lines are occasionally tied together, and extend a mile or more. The flesh of these eels is relished by some; but in the opinion of most persons its flavour is somewhat coarse and strong.

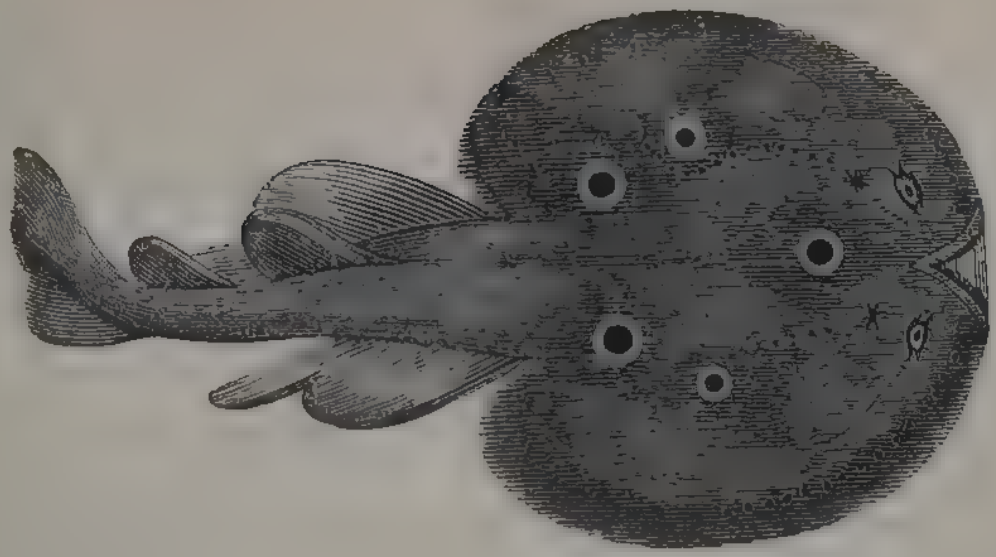
But there is another kind of eel, which, if it be not disagreeable to taste, is certainly *shocking* to touch—I mean the Gymnotus.

THE GYMNOTUS, OR ELECTRICAL EEL.—This truly wonderful fish is met with in South America, and has much excited the curiosity of many persons. It has the marvellous, though not the entirely singular property of an electrical machine, and can at its own will discharge so much of that influence as to strike with death some animals; and it can give a very remarkable specimen of its power on the human frame. Any person, or number of persons joining hands, and connecting themselves

with the fish and with the water of a vessel containing it, will experience the same effect. Experiments of this kind have been frequently made and related. We may notice those of Drs. Williamson and Gordon. The former of these gentlemen tells us, that, on touching an electrical eel with one hand, the effect is just that communicated from the conductor of a machine. While another person provoked the fish by disturbing it, Dr. W. put his hand into the water at the distance of three feet from the animal, and felt an unpleasant sensation in the joints of his fingers. Some small fish were thrown into the water, when the eel instantly stunned them thus and swallowed them. Another fish was thrown in at some distance: the creature swam up to it, and at first turned away without exercising its power, but in a little time he returned, and, looking at it

stedfastly for a few seconds, gave it a shock, after which it instantly turned on its back and became motionless. Eight or ten persons with their hands joined felt a shock, on the first touching the head and the last the tail of the fish; and a poor dog, who was made a party in this business, evinced his sense of the proceeding by a loud yell. The parts of the fish that produce this astonishing effect form about one third of the whole animal. There are two portions of the apparatus on each side. Their structure is very simple and regular, and consists only of flat partitions of about ninety in an inch, with appropriate nerves.

Although this species of eel belongs properly to the fresh-water fish, I have introduced some account of it, as it shows the power of giving an electric shock in a superior degree to the sea fish which possesses the same property—I mean the Torpedo.



THE TORPEDO, OR ELECTRIC RAY.—This is a flat and nearly circular fish, of the ray kind, and is common on our British shores. It sometimes weighs sixty or seventy pounds, and is an eatable, though not a delicacy. The torpedo lies commonly in deep water, or he buries himself in the sand, where at low water the foot of man or beast is likely to feel the painful consequences of disturbing him. The experiments and the effects have been nearly the

same in the case of the torpedo as with the electric eel, and therefore we need not repeat the accounts. It seems that the eel has the advantage of the torpedo in the command and degree of this astonishing influence.

THE SWORD-FISH.—The formidable weapon with which this creature is armed has given it the same name amongst nations, ancient and modern. The length of the sword-fish is from ten to twelve feet, but they occasionally attain a larger size, and have been known to exceed four hundred pounds' weight. It has a long and rounded body: its mouth is of a moderate size, and has no teeth; but its long and bony snout more than supplies the place: for, the fish being large and weighty, and moving with great velocity in the water, few animals in the ocean are secure from its attacks. The ter-

rible instrument with which the sword-fish is furnished, has been found buried its whole length in the timber of a ship's bottom. It has been affirmed that an iron pin could not have been so driven by a hammer weighing a quarter of a hundred weight, in less than eight or ten strokes, whilst this marine operator had performed the task at one blow. It is a commonly received notion that it is in consequence of mistaking the hull of a ship at sea for a whale, that the sword-fish occasionally endeavours to thrust his sword-like beak into the vessel. Those who have been on board on such an occasion, found it difficult to believe that the vessel had not struck against some rock unseen below the surface, so great had been the violence of the shock.

The sword-fish are said to go in pairs, and to entertain great hostility to the whale;

conflicts between them have been witnessed. The whale usually dives head foremost, and endeavours to settle with his adversary by a blow with his tail, in which case the sword-fish is completely demolished; but the armed enemy is generally aware of this consequence, and is exceedingly alert in avoiding it. He spins round and usually succeeds in plunging his weapon in the deep sides of the whale; and though the wound is not often of a mortal kind, yet, by successive thrusts during a pursuit continued for many hours, the destruction of the whale is in the end completed.

The flesh of the full-grown fish is said to be hard but good; that of the young fish white, agreeable, and nourishing. At Genoa, young ones are sold and eaten; and the Sicilians purchase the fish eagerly at its first coming into season.

THE COMMON COD. — Some of our young friends may be apt to ask, "What is there wonderful in a common cod?" The parties who might be tempted to put such a question, are the very persons who need the information which we will now endeavour to supply.

Presuming that it is needless to describe minutely a cod fish, I shall only observe here, that it is distinguished by three fins on its back, by a tail nearly even, and by a kind of fleshy appendage to the upper jaw. It weighs from twenty to forty pounds, more or less.

But there are two causes of wonder regarding this, and some other kinds of fishes: I mean their periodical and distant migrations from shore to shore, and the incalculable myriads which compose their shoals. From the sand-banks of Newfoundland, Nova Scotia, and New England, to the regions of the

Polar Seas, they regularly go and return at certain times of the year; and they perform these arduous voyages in numbers entirely beyond computation, as they extend over a surface of many miles in length and breadth.

Before the discovery of Newfoundland, the principal fisheries for cod were on the coasts of Iceland and the Western islands of Scotland. Four hundred years ago, the English resorted to the former country for these fish, and one hundred and fifty vessels were employed in that traffic. But now far more eligible spots are selected on or near the American continent, the chief of which is that on the shores of Newfoundland, where a great bank, rising from the sea, and four or five hundred miles long, is the grand scene of the cod-fishery. Here fifteen thousand British seamen are employed from the beginning of February to

the end of April. The fish are taken with a hook and line, and an expert hand will sometimes catch four hundred in a day; an employment, however, very far from agreeable or easy, on account of the coldness of the climate, and the great weight of the fish. As soon as the cod are landed, the heads are cut off, and the bodies are opened, emptied, and salted. They are then stowed in the hold of the vessel, with a layer of salt to each layer of fish, and when they have remained three or four days to drain, they are put in a fresh place and again salted.

Cod are taken by the Norwegians in strong nets, of which they have occasionally four hundred fathoms out at a time, which, being laid in the afternoon, and taken up the following morning, frequently bring their owners three or four hundred fine fish. In Lapland

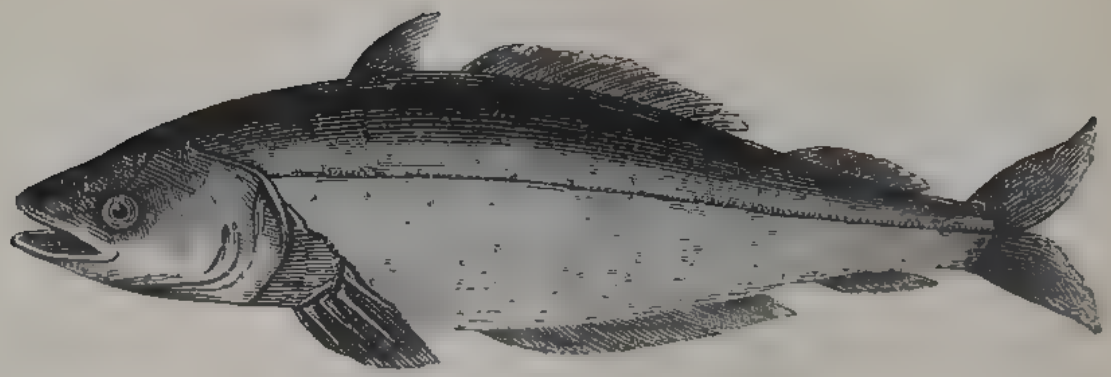
and other high latitudes, the cold saves the trouble of salting. The cod are hung up in open buildings, and remain frozen and sweet till the succeeding spring, when they are cleansed and dried.

Haddocks, which are a smaller species of cod, migrate also in vast shoals in the winter. These shoals have been known to extend three miles in breadth, and FIFTY miles in length! The fishermen frequently take two tons weight of them in a single boat during the day! Haddocks bear on their sides a peculiar mark, superstitiously regarded as the impression of St. Peter's finger and thumb, and supposed to be perpetuated in order to identify the fish out of whose mouth the Apostle took the tribute-money.

Whitings are a still smaller sort of the cod tribe. They are chiefly taken on the French

coasts, but they frequently approach the English shores in shoals some miles in extent. It may seem strange that these swarming and comparatively diminutive fish are usually caught with hooks and lines. But these are not single ones in the hands of our angler. The lines are very long, and are furnished with one hundred and fifty or two hundred hooks each. One vessel will hang out twenty lines, bearing, it may be, four thousand hooks, and thus multitudes are taken with little trouble.

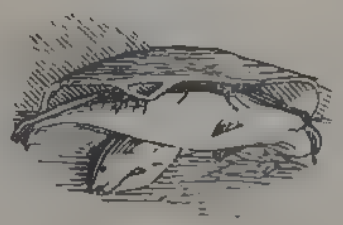
The Ling is about three or four feet in length, and is a fish of considerable importance in commerce. Nine hundred thousand pounds weight are yearly sent from Norway, and we have a large supply of an excellent kind on our own shores.

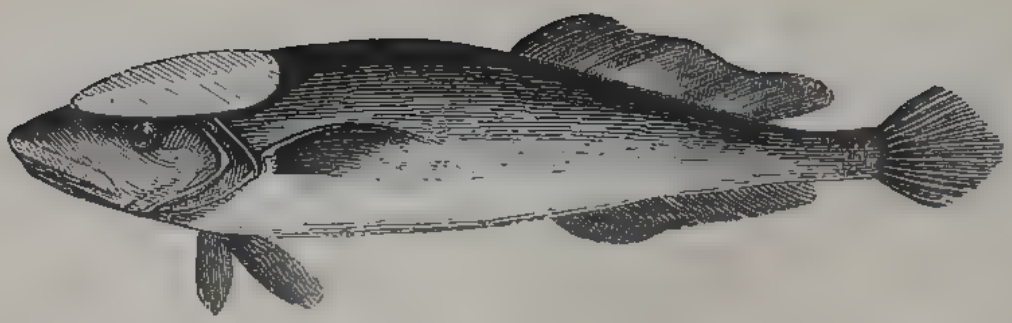


Coal-fish, or Pitlocks, of the same tribe, and two or three feet long, owe their name to the dark colour of their bodies. The Orkney Islanders find these a most important supply of food at a time when other provisions are extremely scarce, and they yield an oil which maintains their needful lamps during a great portion of the year. So expert are the people in catching them, that they will draw the fish up nearly as fast as they can put down their lines. The fisherman baits with sprats or limpets, and, holding

one or two of these with his mouth, he baits his hook with one hand with the greatest certainty and ease.

The Capetan is a fish also of the cod tribe, though not more than six or seven inches long. It is black within, but considered very delicate eating. In the Newfoundland fishery these fish are found to be of great use in supplying baits for the taking of cod.





CHAPTER VI.

THE SUCKING-FISH, OR REMORA.

This is a most extraordinary animal, and as such has been regarded by ancients and moderns. Wonderful as is the peculiarity which gives rise to its name, the naturalists of former days, and the poets especially, attributed to it really miraculous powers. Thus they fabled that this fish, scarcely a foot long, could stay the motion of a vessel

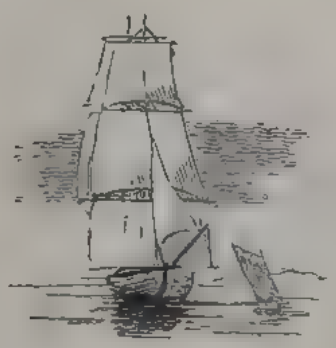
by adhering to the bottom. On this supposition the following lines have been written :—

"The sucking-fish beneath with secret chains
Clung to the keel, the swiftest ship detains,
The seamen run confused, no labour spared,
Let fly the sheets, and hoist the topmast yard.
The master bids them give her all the sails,
To court the winds, and catch the coming gales;
But, though the canvass fills with every blast,
And boisterous winds bend down the cracking mast,
The bark stands firmly rooted in the sea,
And will command, nor winds nor waves obey!"

We must not, however, trust these verses as if they told us no more than the truth. The sucking-fish has undoubtedly the power of attaching *itself movelessly* to vessels, and to shells, to the bodies of many fish, and other substances, by means of a peculiar apparatus at the top of the head. But there is nothing beyond this practicable by the creature; nor is the act,

when performed, destitute of a ready explanation. It is possible for any one to put a glass to his lips, and by partially exhausting the air, to cause it to adhere with considerable force. It is evident that the remora has the power of creating a still more effective vacuum by some muscular effort, so that it has been found impossible to disengage it, without causing its destruction.

The sucking-fish somewhat resembles a herring in size and form, and is found in most parts of the ocean. It has been used by the Indians for the purpose of taking other fish.



THE JOHN DORY, or JAUNE DORÉE, probably so named from its peculiar golden yellow colour, cannot be accounted remarkable on account of its beauty. The engraving does it full justice, and certainly represents a most hideous-looking creature. It is a flattish fish, with a very large head, and a still larger mouth in proportion. It weighs sometimes ten or twelve pounds, and then measures eighteen inches across; but the average weight is scarcely half as much.

The Dory, or Dorée, contends with the haddock for the honour of bearing the marks of St. Peter's fingers, each being supposed to have been the fish out of whose mouth the Apostle took the tribute money, leaving on its sides, in proof of the identity, the marks of his finger and thumb. The name of Dorée was therefore said to be derived from the French *adorée*, worshipped. Our common appellation of John Dory, is also said to be of foreign derivation, and even with a second reference to St. Peter. The fishermen of the Adriatic call this fish *il janitore*, the gatekeeper, in allusion to the supposed keys of the gates of heaven, of which the Apostle is pictured to be the bearer; and in several countries of Europe the Dory is called St. Peter's fish.

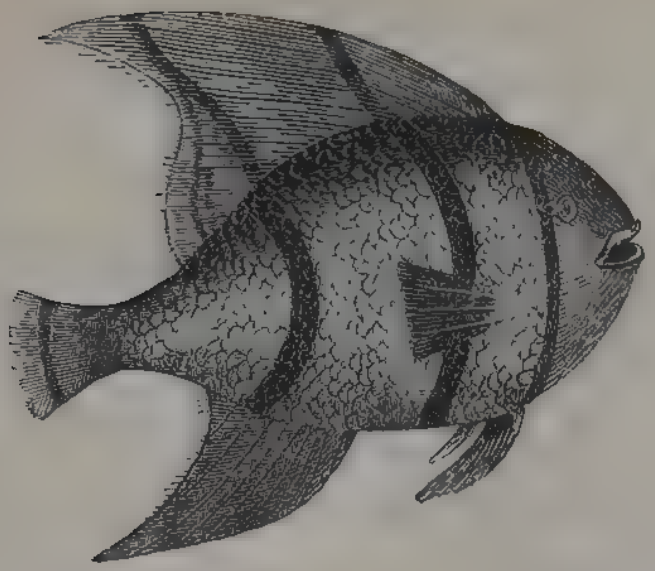
John Dory has of late years been esteemed

a wonderful delicacy at the tables of the rich. Our ancestors, when they caught it, probably felt disinclined to make a trial of its qualities as food. It is a most voracious feeder in the deep, and will seize almost any prey which it can swallow. This fish is so well armed with spines and teeth, as to be protected from most of its enemies in the water; but now that it has the misfortune to be esteemed by man, it is drawn very frequently thence by our fishermen, and sent to market.

FLAT-FISH.

FLAT-FISH comprise a great many species, most, if not all of which, are noticed as agreeable and wholesome food. The fish called the *Ray kind* by naturalists, greatly resemble flat-fish in form. The torpedo, already described, is one of this sort. Amongst the proper flat-

fish, the chief are the *turbot* and *halibut*, the *brill*, *sole*, *plaice*, and *flounder*. The large fish called *skate* and *thornbacks*, the young of which are named *maids*, are of the ray kind. These are commonly brought to our fish-markets, and their features, if such we may term them, bear an uncouth likeness to the human countenance. The turbot is now much in request for the tables of the wealthy. This fish is broad and flat, and weighs sometimes as much as thirty pounds. It is taken on the northern shores of England and on the Dutch coasts. The halibut grows much larger, and weighs occasionally three hundred pounds or more.



THE CHÆTODON is a fish which is distinguished by a method of taking its prey, unpractised by any other creature, I believe, but man. I mean the plan of *shooting it!* Of ammunition this sporting tribe have no lack, for a drop of the ocean supplies the place both of powder and ball, whilst a beaked and tubular nose forms the instrument or gun. The food of the fish is flies and small insects, that play about a short distance from the surface. When the Chætodon perceives a fly

not too far off, it approaches carefully, and comes as nearly as possible beneath its object. Having fixed its eye accurately upon it, it shoots a drop of water from its concealed weapon, and with such truth of aim, that it rarely fails of bringing the fly down to the water! A number of these fishes were taken and placed in a tub of sea-water. After a short time they became sufficiently reconciled to their situation to exercise their craft under the inspection of a gentleman, who suspended a fly over them for that purpose. They performed thus daily, and seldom missed their mark.

We now come again to tribes, interesting in a far more important degree, as supplying in the fullest abundance multitudes of the human race with luxurious viands.

THE MACKEREL I need not describe, and yet, common as it is, there are many, I doubt not, who have failed to observe the real elegance of this fish. When fresh, it is perhaps as beautiful a specimen of the fine radiant pencilling with which Nature ornaments her works, as any of the finny tribes; and it is remarkable, that when these tints begin to grow dim, and lose their lustre by daylight, the darkness reveals even more surprising splendours, emanating from the body of the fish. I would recommend my readers to take an opportunity of examining a mackerel with suitable attention, both by day and night, for themselves, and I think they will admit that it deserves a place, on the score of beauty, amongst the wonders of the deep.

But in mackerel we are led to admire again the unmeasured bounty of Providence, in send-

ing to our shores a supply, which is indeed so ample as not to be visibly reduced by all the demands which man can make upon it. Nothing but the expense of conveyance prevents the presence of mackerel on the table of every poor man in the land during their proper season: and at the sea-coast they are often so abundant as to remain unused unless for the purpose of manure.

Mackerel are taken sometimes by lines, with a bait formed of a bit of red cloth, but most commonly with drift nets, twenty feet deep by one hundred and twenty feet long. Twelve, fifteen, and sometimes eighteen of these nets are attached lengthways to each other, by tying along a thick rope called the drift-rope; and, when arranged for depositing in the sea, a large buoy fastened to the end of the drift-rope is thrown overboard, and the vessel sails

away before the wind till the whole of the nets are run out. The net thus deposited hangs twenty feet deep from the drift-rope, and extends from three quarters of a mile to a mile, or even a mile and a half, according to the number of nets belonging to the party engaged in fishing together. The chief fishery is on the western coasts of England, where a capital of almost £200,000 is employed. A single boat has been known to bring in, after one night's fishing, a cargo that has sold for seventy pounds. They are not less plentiful on the coasts of Suffolk, Hampshire, and Sussex. In February 1834, one boat's crew from Hastings cleared a hundred pounds by the fish caught in one night.

The Mackerel as feeders are voracious, and their growth is rapid. Their principal food is probably the fry of other fish; and at

Hastings they follow towards the shore a small species of fish which is there called in consequence the Mackerel Mint, and is probably the young of the sprat. They die almost the instant they leave the water, in which I understand they appear of a golden colour.

THE SALMON.—This is one of the richest treasures brought by the ocean to our shores, whether we consider the quantity, the quality, or the commercial value of the commodity. It is unknown to the Mediterranean and the southern seas, but inhabits the northern main in vast numbers, and, happily for us, resorts with surprising regularity and determination to certain of our rivers, up which the salmon forces its way against wind and torrent, shooting up rapids with the velocity of arrows, and making wonderful efforts to sur-

mount cascades and other impediments by leaping, frequently clearing an elevation of ten or twelve feet.

The height of this perpendicular spring does not appear to exceed twelve or fourteen feet: if they leap higher, they are exhausted, and the force of the current dashes them down again before they have recovered their energy. They survey the difficulty before them for some minutes with motionless attention, then advance, and again retreat, till, summoning all their force, they spring upwards, and commonly attain the upper water by the effort. It frequently, however, happens, that they want strength to accomplish the entire height, and, then falling back, they are easily taken by those who watch their opportunity below. On the river Liffey, in Ireland, there is a cataract stated to be

nineteen feet high, where in the salmon season many of the inhabitants amuse themselves in observing the fish leap up the torrent. They frequently fall back many times before they surmount it, and baskets are placed in a proper position to receive them when they fall.

The principal fisheries in Europe are in the large rivers, or on the sea-coasts adjoining them, of England, Scotland, and Ireland. The Tyne, the Trent, and the Severn, are the chief English streams which supply them. It is calculated that above two hundred thousand salmon are caught on an average in a year in the river Tweed in Scotland.

Hunting fish on horseback seems a somewhat surprising sport; yet this mode has been adopted on the shallows at Whitehaven with considerable success. Taking advantage of

the retiring tide, persons have thus got between the salmon and the sea, and have fairly coursed them, until a spear could be accurately thrown. Forty or fifty have thus been hunted in a day.

Salmon of various kinds have poured in such numbers up the rivers of Kamtschatka, as to force the waters before them, and stop the currents, so as to make them overflow their banks. Such multitudes are thus left on dry ground as would cause a pestilence by their decay, if bears and dogs did not do their part diligently to prevent the evil.

HERRINGS and PILCHARDS, which differ so little that it is difficult to distinguish them, although very inferior in size and flavour to the salmon, are yet a most valuable gift of Providence to the British and other shores.

Of all migratory fish, the herring and the pilchard take the most adventurous voyages at sea. Herrings are found in the greatest plenty in the higher northern latitudes. In those inaccessible seas that are barred with ice the greater part of the year, the herring and the pilchard find a quiet and secure retreat from their numerous enemies. Thither neither man nor the fish which seek them as their prey ever follow with much success. The quantity of insect food which those seas supply is incalculably great. Here, therefore, those fish live awhile at ease, and multiply beyond all computation. But, as the ice dissolves with the changing season, and other scenes become desirable, the herrings and pilchards leave the arctic regions, and proceed southward in shoals so enormous, that were all the men in the world loaded

with them, it has been calculated that they could not take the thousandth part away!

In their outset this immense swarm of living creatures is divided into distinct columns, five or six miles in length, and three or four in breadth; and in their progress they even make the water eddy before them. They are found in June about the Shetland Islands, whence they proceed to the Orkneys, and, then dividing, surround Great Britain and Ireland, and unite again off the Land's End in September: thence the great united body steers south-west, and they next appear on the American coasts. They again divide after a time and enter all the bays and creeks in amazing quantities, and continue till the latter end of April, when the old fish return to the ocean, and arrive at Newfoundland in May.

Thus these surprising navigators perform

their accustomed voyages, and visit their appointed shores at the proper time, feeding nations as they go. It has been calculated, that the offspring of a single herring, if suffered to multiply for twenty years, would form a mass ten times the size of the earth.

Sprats are a much smaller fish of the herring tribe. They usually frequent the deep parts of the sea, but in autumn approach the smooth and sandy shores. They arrive in the Thames about the beginning of November, and leave it in March; affording in winter a great relief to the poor of London and the neighbourhood. They are cured like herrings at Yarmouth.

THE STURGEON, from its superior size and quality, has been honoured with the distinction of the royal fish. It sometimes attains eighteen feet in length, and five hundred pounds in weight; but with us it is never taken of that bulk. It is properly a salt-water fish, but like many others can exist well enough in fresh, and comes up the rivers at certain periods of the year. The nose is long, slender, and pointed, the eyes very small, and near the nostrils. The mouth is placed far beneath, is small, has no teeth, and is even

without jaw-bones. The body is long, five-sided, and covered with rows of hard tubercles. Between the end of the nose and the mouth are four long tendrils, which have much the appearance of worms, and it is supposed that by means of these the sturgeon attracts fish to his mouth, which thus become his prey.

Large as these fish are, they have the power of leaping out of the water to a considerable height, and make so much noise in their fall as to be heard to a great distance. They sometimes accidentally fall into the small boats of the Indians and sink them. On this account it is often dangerous to approach the places much frequented by them.

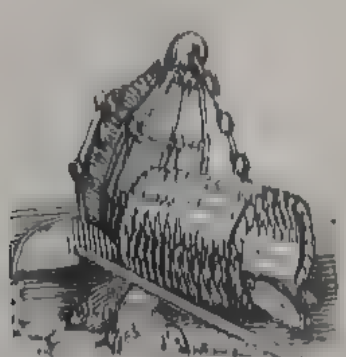
THE LAMPREY is another fish that inhabits both the salt and the fresh waters. It has an eel-shaped body, and sometimes weighs about four or five pounds. Lampreys are esteemed as an excellent dish for the table. The death of our Henry I. it is said, was occasioned by an intemperate meal of this fish. The lamprey has the faculty of adhering to solid bodies like the sucking-fish, but it is merely by applying its lips and

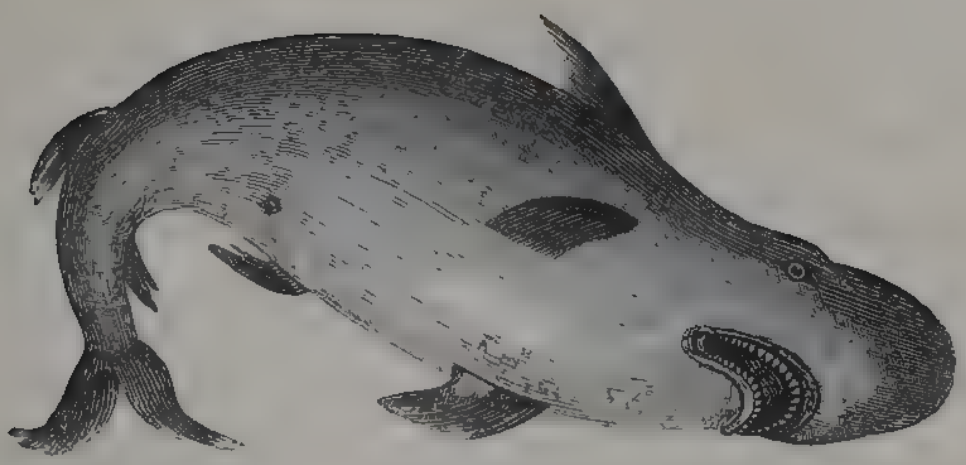
withdrawing the air. The river Severn is noted for lampreys, and the city of Gloucester is required by ancient custom to present to the king at Christmas a lamprey pie with raised crust. At that season, however, it is by no means an easy task to discharge this obligation, and the corporation of the city have sometimes much difficulty in supplying this scarce commodity.

CHAPTER VII.

We have briefly described the large inhabitants of the ocean, and also fish, properly so called; these, in addition to many surprising circumstances of appearance and character, for the most part possess qualities rendering them highly interesting and important, considered as creatures for the use of man. Before we notice others thus distinguished amongst reptiles, insects, and worms, we must examine a few of those species amongst the fishes which are chiefly remarkable as objects of curiosity to the naturalist. Amongst these we may certainly say that the Shark claims pre-eminence.

The size of some Sharks, the form of others, and the savage voraciousness of all, make them sufficiently noted amongst the finny tribes. They are distinguished by having, instead of gills, from four to seven breathing apertures on each side of the neck. They are found in all seas, and some of them are of vast size, measuring from twenty to thirty feet, or even more, in length.





The *White Shark* is a very dreadful and rapacious fish, the largest of all the sharks. It has been seen four thousand pounds in weight, with a throat capable of swallowing a stout man whole. Some have supposed that this is the fish referred to in the history of the prophet Jonah. Swimmers very often perish by these sharks. The white shark has six rows of teeth, very hard, sharp,

and pointed; these he can raise or depress at pleasure, and it *is* his pleasure always to do the former, when prey of any kind comes near them. The mouth of the shark is placed so far beneath, that he is obliged to turn a little on one side to make his seizure, and this circumstance gives other animals some chance at times of evading him. The terror occasioned by the sight of the white shark, with his open jaws, goggle eyes, and large and bristly fins, agitated like the mane of a lion, is indeed great. Unfortunately, sharks are in general partial to human flesh, so that it is very dangerous to be in the water near them. Sharks are found in most seas.

The *Basking Shark,* so called from his habit of lying on the surface of the water, though very large, is not dreaded, as it possesses not the ferocity and voraciousness of the former.

Nay, it will even permit itself to be patted and stroked without moving. Sharks of this kind visit our seas during the warm summer months, and are known on the coasts of Scotland and Wales. The liver of one of these fish, from which good oil is extracted, frequently weighs a thousand pounds. The animals, therefore, are sought and taken by many, and the oil of a single fish has been sold for thirty pounds.

There is a species called the *Hammer-headed Shark*, whose form seems as singular as can well be conceived. This creature, sometimes called the *Balance-fish*, differs from all other animals in the world by the position of its head, which is set on cross-ways like the head of a hammer. It is caught in the Mediterranean, but I believe is not very frequently met with.

THE FIRE-FLAIRE, OR STING RAY, is a flattish, nearly circular fish, with a tail armed with sharp spines capable of inflicting very dreadful wounds. The ancient naturalists contended that there was a venom belonging to this fish which would even dissolve stone. That there are some stones capable of being softened by some animal juices is likely; but it does not appear that the fire-flaire can do more than lacerate the flesh in a very severe manner.

THE FLYING-FISH.—This is a name given by English writers to several species of fish, which, by means of their long fins, have the power of performing flights in the air, in the manner of birds. The flying-fish, most properly so called, is about six inches in length, and it resembles the herring in its general form and appearance. Its gill-fins are so long as, when laid close to the body, to reach to the tail, and they are in fact double.

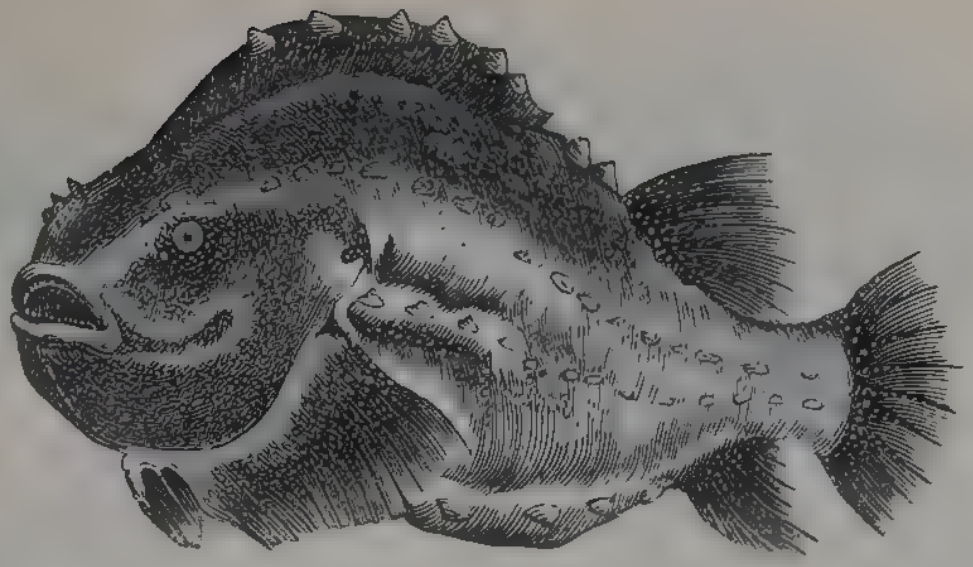
The flying-fish has numerous enemies in the

ocean, and unhappily not a few in the air, but it certainly has a double chance of escape by the alternative presented to it. Its flight seldom exceeds sixty or seventy yards at a time, but this it can renew by dipping its fins in water when they become too dry. These fish are often seen to rise from the sea, not singly, but in numerous companies. They are apt to become suddenly exhausted, and shoals of them sometimes fall on board vessels navigating in the warmer climates.

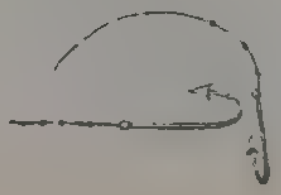
In order to give our readers an idea of as many of the wonders of the ocean as could be made room for in this little book, engravings have been supplied of various forms of fish, which are sufficiently strange, perhaps we may say hideous, to satisfy the inquirer of the fact that the sea is a vast receptacle of most

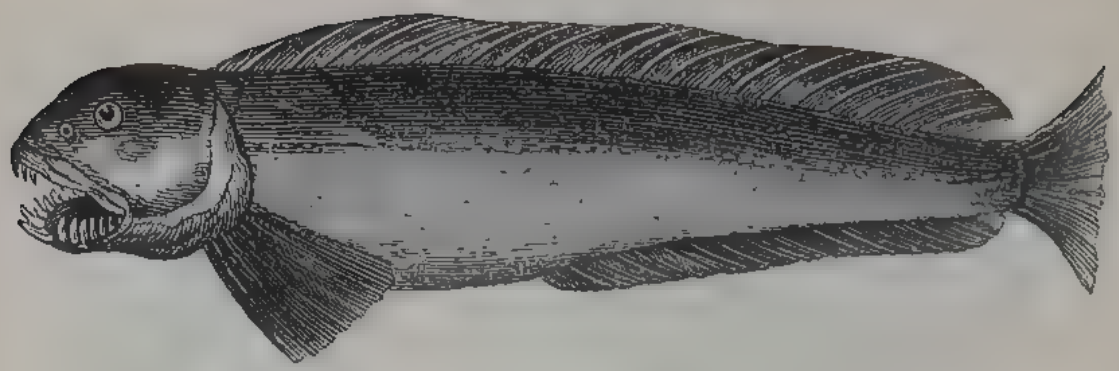
curious objects. But it is to be kept in mind, that as yet we know few particulars of many of these species, just those only which regard the external appearance. In many cases those persons who, during voyages, have accidentally obtained a sight of fish the most astonishing to the eye, have been quite unable to do more than make a hasty sketch, perhaps only to describe from memory the thing once under their inspection. Wherever more is known, I have endeavoured, as far as possible, to give the information. I do not expect my readers to praise the beauty of any of the individuals which follow.

THE HIPPOCAMPUS is sometimes called the sea-horse; a name, however, which has been applied to other marine animals. The fish so designated is but a few inches in length, and has been termed hippocampus, from the resemblance which its head bears to that of a horse, and its body to that of a caterpillar. Its whole body is in fact composed of rings, having stiff hairs, or prickles, proceeding from them. It is said that, into whatever form you bend the tail when living, it will retain it when dead. It is caught in the Mediterranean.

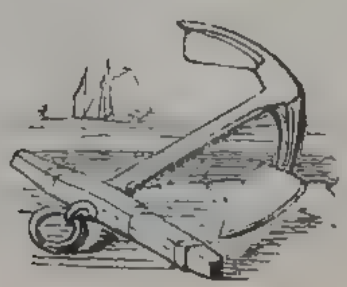


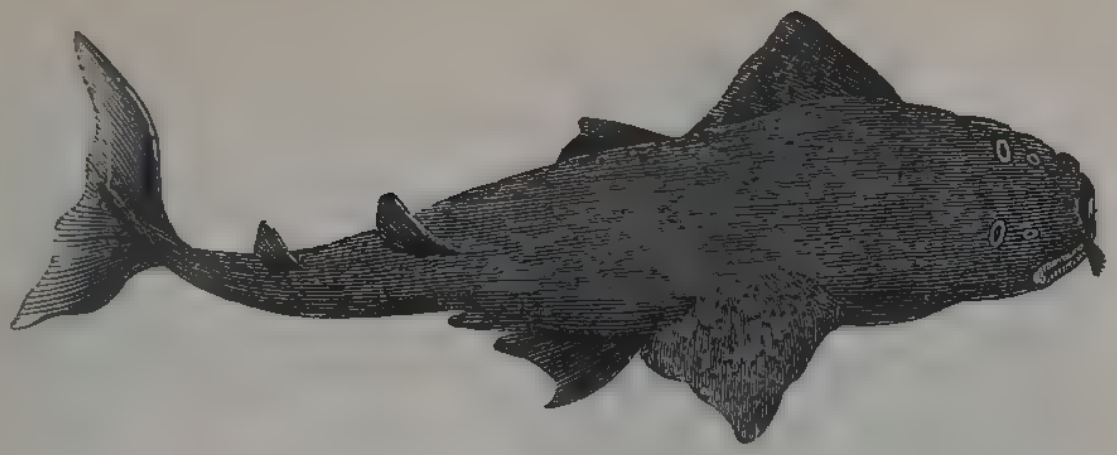
THE LUMP-FISH is, as it is represented, a thick and somewhat clumsy creature to look at. It has no scales, but is covered with a rough skin. Its mouth is large, and furnished with a great many small teeth. It adheres firmly to rocks and other substances. The lump-fish is taken in the English seas, and is sometimes sold in London; but it is not much esteemed.





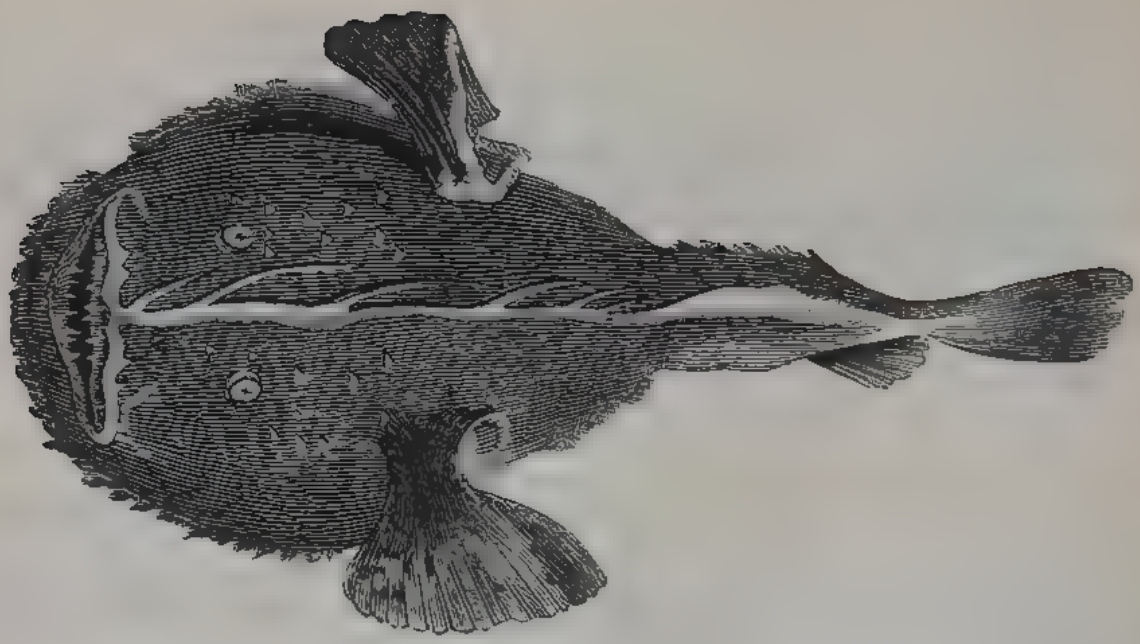
LUPUS MARINUS, or the SEA WOLF, is a fierce and voracious fish, confined to the northern seas. The teeth are so strong and hard, that if it bites against the anchor of a ship, or any such substance, it makes a loud noise, and leaves its marks in the iron. This fish grows to the length of seven feet, and has been taken on the Yorkshire coast as large as four feet long or more.





THE MONK-FISH is another curious creature found near our British shores. It is something between the flat-fishes and the longer sorts. It grows to the length of five or six feet. Its upper fins much resemble wings, whence it is called by some the angel-fish.

SEA DEVIL.—I suppose that there is more than one species of fish in the ocean, whose frightful form has procured it this maledictory appellation. I have discovered representations of two, each of which seems fairly entitled to the distinction conferred by the name.

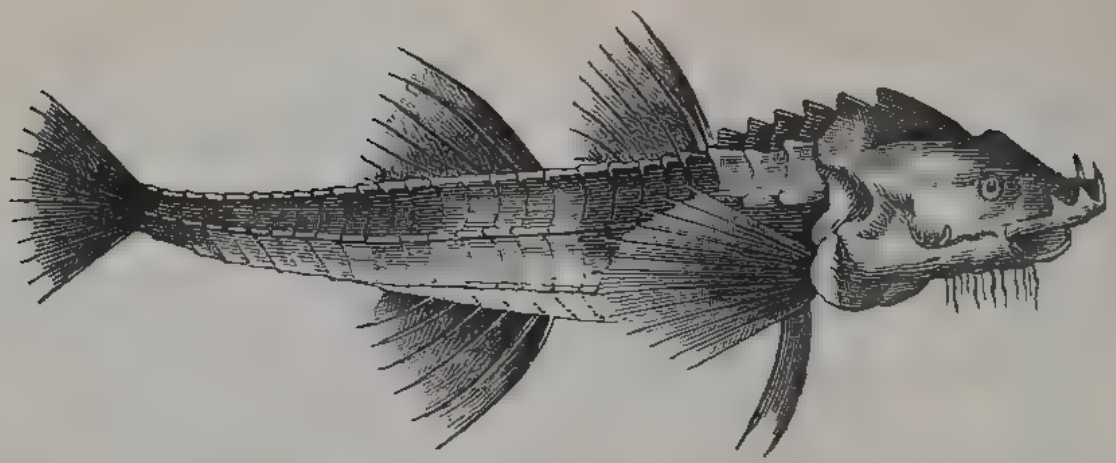


That called also the Toad-Fish has a head quite as large as its body, with a mouth of uncommon dimensions. I find nothing said of it which adds much to the knowledge obtained by a sight of the engraving. The flesh, when boiled, tastes, it is said, like that of a frog.

The Sea-Snake.—There is so much resemblance between the snake and the eel, that it is difficult to distinguish those of each kind

which inhabit the waters. There is a sea-snake, caught in the Mediterranean, whose flesh is exceedingly well tasted, though bony; and there is a kind mentioned by some writers several hundreds of feet in length, and which are said to throw themselves over vessels and sink them; but I do not find sufficient authority for the accounts given of this creature.

The Sun-Fish, found in the Mediterranean and the British seas, has a very singular figure. Its body is broad and short, and its end is terminated by a circular fin, so that it looks like the head of a large fish severed from its body. It measures frequently two feet the longest way, and sometimes much more, weighing two hundred pounds. It has no scales, but a hard and rough skin. The head does not project at all from the body.



The Pogge is a small sea-fish common on our own coasts. It is seldom more than five inches long. The head is large, bony, and very rugged. The body is eight-sided, and covered not with scales, but with a number of bony crusts, projecting in sharp points.

Lyra is the name of a fish which is caught in the Mediterranean, and brought to the markets in Rome. It grows to the length of ten or twelve inches; has a slender, round, smooth body, coloured yellow, blue, and white, the blue being the richest cerulean, and of inexpressible splendour.

The Porcupine-Fish shows plainly that its name is not misapplied. Its usual size is between twelve and twenty inches in length; it is very thick, and covered with a whitish skin, every way beset with strong sharp thorns: the opening of the mouth is very large. This species is found near the Cape of Good Hope.

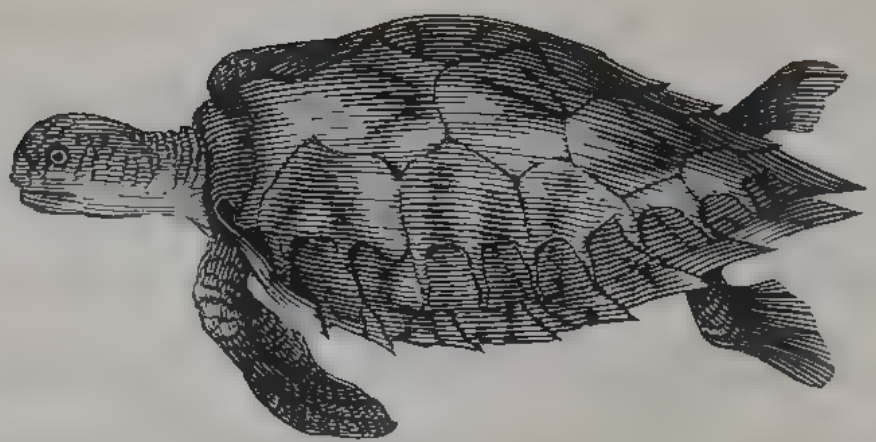
We must now leave the fishes and examine creatures of another class that inhabit the ocean, and properly belong to it, but which

can visit the shores, and reside upon the land. Such are called *amphibious* animals.

Tortoises are animals of this kind. They have an advantage over most others, by being always furnished with a residence, which affords them constant shelter, and great security at the same time. This they carry about with them. It is a complete suit of armour, better fitted to the body than any ever worn by warrior, even of high degree, and consists of two parts, like dishes joined together at the edges. They have just such apertures in them as leave room for the head, tail, and legs. The head can be drawn in, or nearly so, whenever it is desirable that so important a part should be more completely *at home* than usual. The head is small, and has no teeth, but a kind of bony apparatus

supplying the place. The jaws are exceedingly strong, and when closed cannot be opened by human power. The legs are short, and also so strong that a large animal of this kind has been known to walk away with five men on his back; and this he would do without any apparent effort or concern. The species that inhabit the land and fresh waters feed chiefly on worms, snails, and fish; those of the ocean for the most part on sea-weeds.

There are about thirty-six different species of this class, four of which belong properly to the sea; three only need particular mention.



The *Green Turtle.* The length of this now most celebrated kind of tortoise is sometimes six feet, and the weight five or six hundred pounds. One is spoken of which was six feet broad and four feet in thickness. A lad ten years old sailed a quarter of a mile very comfortably in the upper shell, made use of as a boat. Green turtles, so called on account of the general colour of their flesh and fat, are found in great numbers on the tropical shores both of the new and old worlds. There, vast fields of the

sea-weed, on which the turtle luxuriously feeds, occupy the bottom of the clear sea. Amid these submarine pastures, the turtles browse at their pleasure, and numerous herds of them are frequently seen thus employed beneath the waves, apparently enjoying the fruits of their peculiar inheritance not less than the cattle on our verdant and sunny hills.

The turtles are quiet neighbours amongst themselves, and, finding plenty of that which contents them, they have happily no inducements to contention. When satisfied, they frequently retire to the fresh water at the mouths of great rivers, where they float, holding their heads just above the surface. When thus far above, however, they are liable to many dangers, of which they are fully aware, and they dive instantly on perceiving the slightest cause for alarm.

In the month of April chiefly these animals frequent the shore, and deposit their eggs, which are two or three inches in diameter, and nearly globular, in the sand. They scratch holes with great diligence for this purpose, and lay sometimes a hundred eggs at different times. The usual method of taking these poor animals, is by turning them over on their backs, in which case the turtle can never recover its position. It sometimes requires the strength of several men to accomplish this, so heavy are the larger turtles. I am sorry to say, that men are inconsiderate or cruel enough to serve in this manner many more than they have any occasion for; thus the unoffending animal dies a lingering death, and a large quantity of excellent provisions is wantonly destroyed.

I need not, I suppose, inform my readers,

that the flesh of the turtle is esteemed as a high delicacy by our wealthy epicures: the turtles for their consumption are chiefly brought from the West India islands.

The *Loggerheaded Turtles* are found in the abovementioned parts, and also in the Mediterranean. These are a larger and stronger kind. They are such determined navigators, as to cross the seas at a distance of eight hundred leagues from land. These animals are extremely fierce and bold, and make a desperate resistance when attacked. They will bite a thick stick in two without difficulty at a single snap, and are scarcely to be disengaged from any substance of which they have once taken hold. The loggerheads live on shell-fish principally, and sometimes they will even seize young crocodiles rather than remain without a dinner. The flesh of this

kind is rank, and scarcely eatable by Europeans.

The *Coriaceous Turtle* is the largest species of this family with which we are acquainted. Some of this kind have been taken eight feet in length, and weighing one thousand pounds. One caught near the mouth of the Loire, in France, measured upwards of seven feet, and is reported to have uttered when taken a hideous cry, which might be heard at the distance of three quarters of a mile, and to have emitted a noisome vapour from its mouth, foaming at the same time apparently with rage.

CHAPTER VIII.

SHELL-FISH.

SHELLS are among the most beautiful and surprising productions of Nature: the description and systematic arrangement of them belong to a distinct branch of science called CONCHOLOGY. Naturalists differ in their modes of classification: some distinguish the several kinds by the form and habits of the creature occupying the shell; others designate them by characters derived from the hard substance which covers and protects them: the latter mode is best suited to our present purpose, and corresponds strictly with the meaning of the term *Conchology*, which has reference to shells only.

This branch of Natural History offers more than usual attractions to young persons, combining a variety of elegant forms with brilliant colouring and exquisite workmanship. It is not necessary to attempt a scientific description of shells in our little volume; the sketch we have given will perhaps be sufficient to lead many to a further pursuit of this interesting study in books which professedly treat on the subject. The plates present a specimen of thirty-seven *genera*, or families; and we shall endeavour briefly to describe the origin of their names, with a few particulars respecting each shell and its inhabitant.

Linneus, Bruguières, and M. de Lamarck, are the authors to whose labours we are principally indebted for an arrangement of this class of animals, which are called *tes-*

taceous, from the Latin word *testa*, a hard covering. Lamarck, in particular, has introduced a system likely to supersede all others; and to his writings on the subject we refer the reader who may at a future time feel a desire to become scientifically acquainted with *Mollusca* and their gay habitations. The animals usually found in shells are soft and without bones, and on this account the term *Mollusca* is applied to them, derived from the Latin *mollis*, which signifies soft.

Testaceous and *crustaceous* are words frequently used by naturalists. Testaceous animals are those which are only partially attached to their shells, like garden snails; crabs and lobsters are examples of crustaceous creatures, because their bodies are covered with a shelly coat-like armour, each limb having its appropriate piece or covering.

There are three classes or divisions in the arrangement of shells, and these classes are subdivided into many families, species, and varieties. The first general class contains those shells which are formed of one piece or valve, called therefore *Univalves*; the second, those which have two valves, called *Bivalves*; and the third consists of such as have more than two valves, called therefore *Multivalves*.

As many shells are common to rivers and the sea, and a few are found in rivers only, we have not here exactly confined ourselves to the products of the ocean.

UNIVALVES.

1. ARGONAUTA ARGO. This animal is supposed to have suggested to men in the earliest ages of society the first idea of using sails; and

Argonaut or Paper Sailor

Tiger Cowry.

Mosaic Cone.

Bubble.

Sailor Fish.

1835. by J. Harris St Pauls Church Yd

on this account perhaps it bears the name of the first ship that ever sailed on the sea, viz. the Argo, in which Jason, with his heroic companions the Argonauts, made their celebrated voyage to recover the golden fleece, in the year 1263 before the birth of Christ. The shell is spirally formed, and is nearly as thin as paper. The curious inhabitant is not thought by many observers to be the fabricator of the shell, to which it is not attached. The Argonaut, or Paper Sailor, crawls upon its long *tentacula*, or arms, the keel of its shell being uppermost, when at the bottom of the sea; in calm weather it rises to the surface, by discharging a quantity of fluid, which rendered it heavier than the sea-water; there it extends two of its arms upwards, each furnished with an oval membrane, serving for sails; its remaining arms, six in num-

ber, hang over the sides of the shell, and supply the place of rudder and oars. It is not easy to take these creatures; for on the least alarm they draw in their arms, take in water, turn over their shell, and sink beneath the wave.

2. NAUTILUS POMPILIUS, or Sailor-fish. This shell is much thicker than the Paper Nautilus, or Argonaut, from which it differs in having the inside of the shell divided into many cells or chambers, through which the siphon, a long tube, passes. The sailor-fish is seen floating on the water like the Argonaut, but has more arms or *tentacula*. It is common in the Indian seas, and is brought to Europe principally on account of the fine mother-of-pearl it affords, which is used in various ways by cabinet-makers and jewellers.

In eastern countries, drinking-cups are made of the shells; and, when converted to this purpose, they are frequently very curiously engraved and ornamented. In the Greek language, *nautilus* means a sailor.

3. Conus, Cone. So called from its conical shape. This genus is perhaps the most beautiful and extensive of all the univalves; it contains the most costly and remarkable shells. The cones frequent the seas of hot climates, at the depth of ten or twelve fathoms: all the individuals of this family are sea-shells. Our engraved specimen is *Conus tesselatus*, Mosaic Cone.

4. Cypræa, Cowry. Cowries are smooth, shining, and beautiful shells, very agreeably coloured and curiously marked. They are

remarkable for the very different appearance which the shell of the same individual assumes at different stages of its growth; in their young state they would not be recognised by an inexperienced observer. Lamarck states that the animal of the Cypræa continues growing after it has completed its shell; and when it finds its habitation inconvenient and small it quits it and forms a new one. Perfect shells of the same species, of different sizes, are often found, which appear to confirm the account Lamarck has given. The example given in the plate is the Tiger Cowry, *Cypræa tigris*.

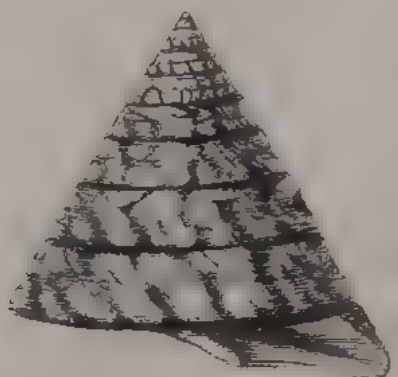
5. Bulla, Bubble. An inflated egg-shaped form is the characteristic of this shell. Many of the family so nearly resemble cowries and other genera not yet described, that some

Music Volute.

Thick Spined Screw.

Wave Ribbed Trumpet.

Rock Shell of the S. Sea Islands.



Marbled Top Shell.

Pubd as the Act directs by J. Harris St. Pauls Church Yd

experience is required to identify them. The specimen on the plate is *Bulla Ampulla*. *Ampulla* means a wide bottle; but the popular name is the Pewit's Egg.

6. Voluta, Volute or Wreath — so named from its cylindrical or rolled-up form. One side or lip of the aperture is plaited, which is a character of this genus.

7. Buccinum, Trumpet. This shell owes its name to a Greek word meaning trumpet or horn. A shell of this genus was in early times used as a trumpet, a portion of the end being broken off to adapt it to this purpose. The herdsmen of open or mountainous countries were accustomed to call their flocks together by sounding these rudely-formed horns.

Buccinum purpura, or Purple-fish, a species of this family, supplied the Romans with the principal part of their celebrated Tyrian dye, which at one time was so very valuable that a pound of wool dyed with it was worth thirty pounds of our money. Cloth of this purple colour was worn by the magistrates of Rome; but afterwards, the dye becoming scarce, the use of the cloth for robes was reserved for the emperors alone, under pain of death. The colour was obtained from other shell-fish besides the *purpura Buccinum;* a species of the *Murex*, or Rock-shell, is known to yield it. The species given in our plate, *Buccinum undatum*, is a native of Britain, and called the wave-ribbed variety.

8. Strombus, the Screw, or Winged, or Claw shell. A Greek word, signifying to

turn round, is probably the source of its name. The individuals of this family too nearly resemble those belonging to others, to afford a very clear character of it. The example given is the *Strombus pugilis*, thick-spined, found usually in the West Indies.

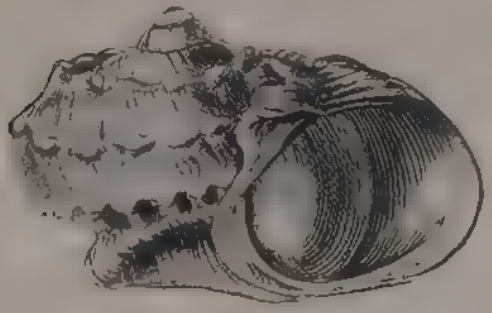
9. MUREX, or Rock-shell. The rough or rock-like appearance of many species of this genus has given the name of Murex to it. Many of the varieties are exceedingly beautiful, particularly the *Murex ramosus*, or branched.

10. TROCHUS, Top or Button-shell. The characteristics of this genus are not clearly marked; it may not mislead the young student to direct him to class in this family all shells of this top or cone-like form. Another

genus, *Helix*, has many very similar varieties; but experience will point out the difference. The specimen selected for our engraving is the *Trochus Niloticus*, or large marbled, a native of Amboyna. The Carrier-shell, which is a species of this family, is usually found with many smaller shells, stones, and fragments of shells, fixed to or embedded in its own shell. It is not determined how this occurs, whether in consequence of this shell having some adhesive matter about it, by which different substances are attached, or from the quiescent nature of the animal affording support to others.

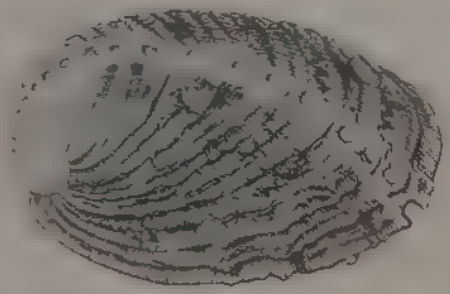
11. Turbo, Wreath or Turban-shell. This genus is in many respects very similar to the Trochus. The aperture or mouth of a Turbo is round, or sometimes inclining to an oval;

Marbled Turban.



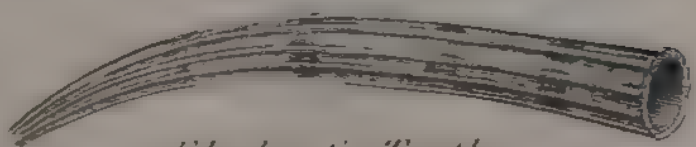
Edible Snail.

Purple-streaked Nerite.



Sea Ear.

Limpet.



Elephant's Tooth.

the shape of this part of a Trochus is angular. The Turbo is a spiral shell, as its name implies. The specimen in the plate is from the Asiatic Sea: it is large, and of a green colour, called *Turbo marmoratus*, or marbled.

12. HELIX, Snail. The name of this genus, *helix*, means a spiral line. An examination of the shell will show its propriety. This family have thin and partly transparent shells. They are found on land, in rivers, and the sea, in most parts of the world. It is worthy of remark, that such of the genus as are the inhabitants of the ocean have shells suited to that boisterous element, rough and strong; river snails, or Helices, have a brittle covering; whilst the land species, found in ditches, are so delicately formed as to be broken with the slightest pressure. Land

snails generally frequent damp places; and withdraw, during the winter, into the crevices of old walls, rocks, or under the bark of trees. They prepare themselves for this torpid state by closing the aperture of their shells with a thin substance forming a kind of lid. In climates affording a continual supply of green vegetable food, they do not retire in the winter; indeed, in this country one species of Helix is also an exception. The larger kind, *Helix Pomatia*, as seen in the engraving, called the Edible Snail, has formed food for man in former times. The Romans consumed great quantities, and had peculiar modes of fattening them. In Paris and other cities they are brought to the markets for sale, but not as an article of food; broths are made of them, for persons afflicted with diseases of the chest and lungs.

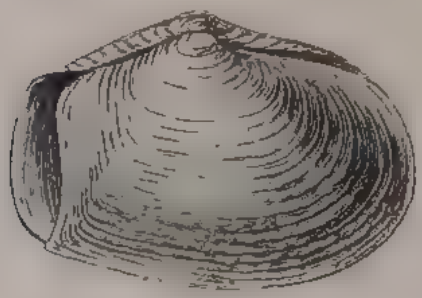
13. NERITA, Nerite or Hoof-shell. This name is probably derived from a Greek word signifying hollow. The shells of this genus are beautiful in the extreme. The specimen in the print is called *Nerita Peloronta*, or Purple-streaked. Many of the species are beautifully enamelled. If the aperture of this shell is viewed in one direction, it somewhat resembles the hollow of a horse's hoof, which, no doubt, was the origin of its popular name of Hoof-shell.

14. HALIOTIS, Sea-Ear. The ear-like form of this shell accounts for its name *Haliotis*, which is compounded of two Greek words, meaning sea and ear. There are six or more perforations in the shell, through which the animal protrudes its arms, or *tentacula*, when in search of its prey or food. It adheres to rocks in the

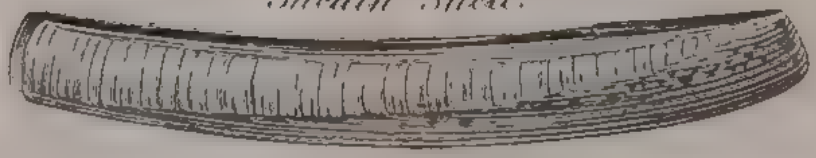
manner of a common limpet, and is with some difficulty disengaged from them. The print represents the *Haliotis tuberculata*, or common plaited Sea-ear, which is found on the British shores.

15. PATELLA, the Dish-shell, or Limpet. These shells are so abundant on the rocks of every shore that it is scarcely necessary to describe their form. The name of the genus, *Patella*, implies little dish. Limpets fix themselves to rocks which are alternately wet and dry from the rise and fall of the tide. They have in a trifling degree the power of motion; they can by a very slow progress remove from one rock to another. It is surprising how strongly they adhere to their station; the shell is often broken in the attempt to disengage a Patella from the rocks; though, when taken

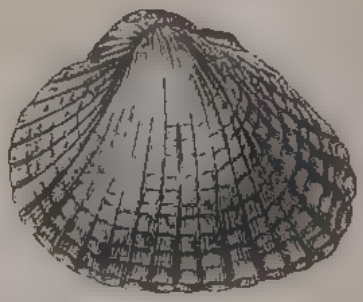
Truncated Gaper.



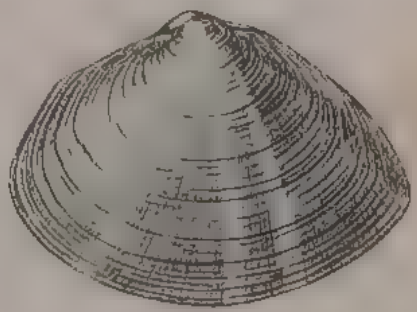
Sheath Shell.



Radiated Tellen.



Common Cockle.



The Kneading Trough.

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unawares, they are easily pushed off by sudden force in a perfect state.

16. DENTALIUM, Tooth or Tusk-shell. The specimen given is *Dentalium Elephantinum*, or Elephant's Tooth. It is usually found buried in the sand. It is said that the creature inhabiting this shell has the power of withdrawing itself to the smaller end of it in case of danger.

BIVALVES.

1. MYA, Gaper. The specimen shown in the engraving is *Mya truncata*, or abrupt, found on the British shores. Shells of this genus are broader than they are long, mostly gaping or open at both ends. They burrow in

sand or mud. A species of this family produces pearls.

2. SOLEN, Razor or Sheath-shell. The Solen is long, gaping at both ends. It makes its way through the sand perpendicularly to some depth in search of its food. Its form is simple, resembling a razor-handle, which well suits its habits of burying itself in the sand one or two feet in an upright position. The example on the plate is found in Britain, *Solen ensis*, or Sword-shaped Solen.

3. TELLINA, Tellen. The shells of this family greatly resemble another, the *Venus*, and in some respects the genus *Cardium:* experience alone will enable the young conchologist to discern their peculiar characters. They are to be found in the fine gravel or

sand of sea-shores, in rivers, and wet ditches. *Tellina radiata*, or Rayed Tellen, comes from South America.

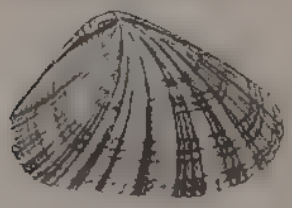
4. CARDIUM, Heart-shell or Cockle. Many shells of this genus are of a heart-like form, and give that name to the family. The only character likely to present itself to the young inquirer is, that the ribs or marks on the shells are always longitudinal, in lines running lengthways, not across the shell; which may distinguish this genus from two others, *Tellina* and *Venus*. These are also heart-like in shape, but the ribs run across their shells. The flesh of this creature is pretty good, and great quantities of them are fished up for food during the winter on the coasts of England, Ireland, and Holland. *Cardium edule* is the common or eatable Cockle.

5. MACTRA, the Kneading-trough. This shell is considered to be improperly so called; naturalists cannot account for its name, but usually refer to the hinge as of singular formation and worthy of notice. The specimen in the engraving is *Mactra stultorum*, or the Simpleton. It is found in Britain; but why so named we do not know.

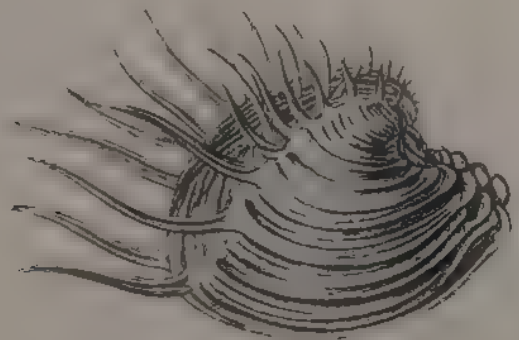
6. DONAX, the Wedge-shell. The derivation of this name is from a Greek word which means an arrow. The shell is shaped like a wedge, which enables the animal, on the approach of danger, to dart into the sand. From this habit it is thought the shell has been named.

7. VENUS, Venus-shell. This genus, it may be supposed, has been so called from the

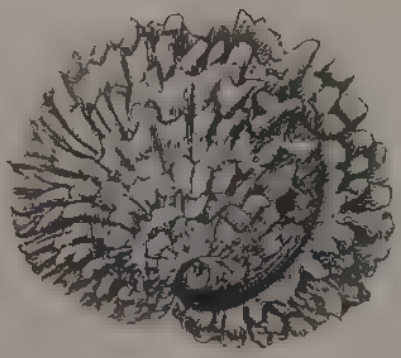
Wedge Shell



Thorny Oyster.



Prickly mouthed Venus



Chama.

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generally beautiful form and colour of the individuals of the family, which resemble very closely the genera *Tellina* and *Cardium*: the difference exists in the hinge, which in bivalve shells is the essential character of most of the families. They are found in most parts of the world, sunk in the sands of sea-shores. *Venus Dione*, or Prickly-mouthed Venus, comes from South America.

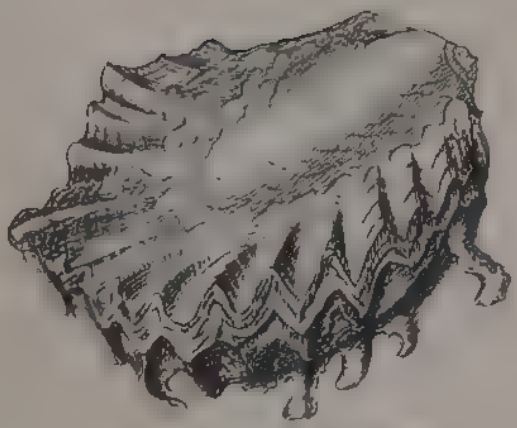
8. SPONDYLUS, Thorny Oyster. This shell is always coarse and rough, with large spines. Spondyli attach themselves to rocks in the ocean, and are with difficulty separated from them. A general resemblance exists between this genus and the Ostrea, except in the tubercles or spines. In some parts of the Mediterranean they are caught in abundance, and are eaten by the inhabitants on the shores of that

sea. This genus is sometimes called the Artichoke. Spondylus is derived from a Greek word, sometimes applied to the prickly head of that plant, to which the thorny appearance of the shell is not unlike. The Greek word, however, signifies strictly knuckle or vertebra. The *Spondylus gædaropus*, or Red Thorny Oyster, comes from Amboyna.

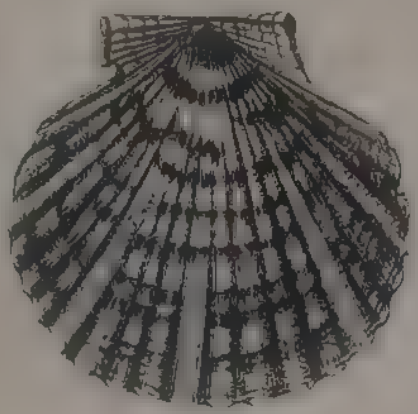
9. CHAMA, Gaper. The Chama fastens itself to rocks and rugged substances by means of a *byssus*, or beard, which it projects from its shell for that purpose: by this means it secures its position and resists the action of the waves. The example on the plate is the *Lazarus Chama*, found in the East Indies.

10. ARCA, Ark. A species of this family gives the name to it, *Arca Noæ*, because it

Noah's Ark.



Leaf shaped Oyster



Painted Pecten.

Saddle shaped Anomia

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is thought to be like Noah's ark in shape. The individuals of this genus are not all like this; the character by which they are known to belong to it is a peculiar form of the hinge; in other respects they vary considerably.

11. Ostrea, Oyster. The shell of the common Oyster has no pretensions to beauty: it is rough, and not finely marked, but sometimes coloured. Oysters are found on most shores: it is the nature of these animals to fix themselves to rocks, loose stones, pieces of wood, or to each other.

The oysters of our own country were in considerable estimation among the ancient Romans. Juvenal the satirist speaks of a Roman senator who at the first bite could distinguish the flavour of those brought from

Richborough, on the Kentish shore, from those of the Lucrine rocks, or Circe's. Pliny also in his Natural History alludes to British oysters; he however asserts that they were less delicious than those of Cyzicum. But Ausonius, in the fourth century, who mentions a variety of good oysters, expresses the high admiration entertained for those taken on the British shores.

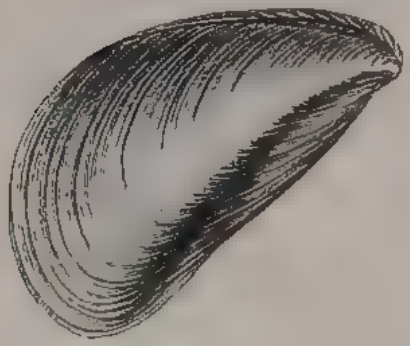
This shell-fish, though certainly not celebrated for agility, love of change, or powers of observation and reflection, is not destitute of motion; it contrives, by an accumulation of mud, to prop itself nearly upright, and patiently waits for the tide to tumble it over: it can only thus turn from one side to the other. One variety has the form of a hammer; and another of a withered leaf, named *Ostrea folium*.

12. PECTENS are very beautiful, and possess powers far above the kind we have just noticed, being able to open and close their shells in so forcible a manner, as to rise some inches from the sand, and tumble forward to the sea. Besides this, the Pecten has the art of moving on the surface of the water, very much in the manner of a vessel. When the sea is calm, little fleets of scallops are observed thus swimming along. They raise one valve of their shell, which becomes a sort of sail, whilst the other forms their boat. When an enemy approaches, they instantly close their decks, and plunge every one to the bottom. They are called Pectens from the supposed resemblance of their shells to the arrangement of the teeth of a comb. *Pecten opercularis,* usually called the Painted Pecten, is found on the British shores.

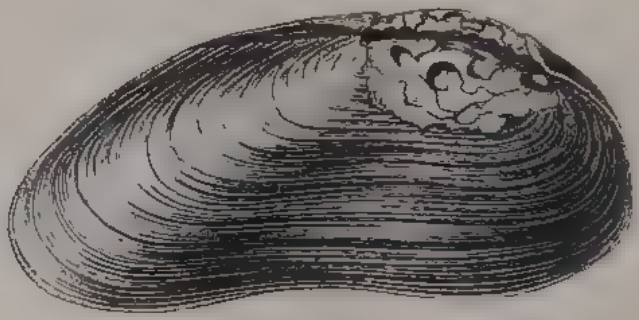
13. ANOMIA, Antique Lamp. The name of this genus, like most others, is from the Greek language, and means, a departure from the law. The individuals of this family are so dissimilar as not to afford any precise character by which to distinguish them. One species has been thought to resemble an antique lamp, but they mostly have one feature in common, viz. a ligature put through a perforation in the shell to assist the animal in retaining its hold of rocks and other substances. The engraving represents an English specimen, *Ephippium*, saddle-shaped, or more frequently named the *Orbicular Anomia*.

14. TEREBRATULA. The shells of this genus are not abundant in a living state; they fix themselves to rocks, at some depth under water, from which they are with difficulty

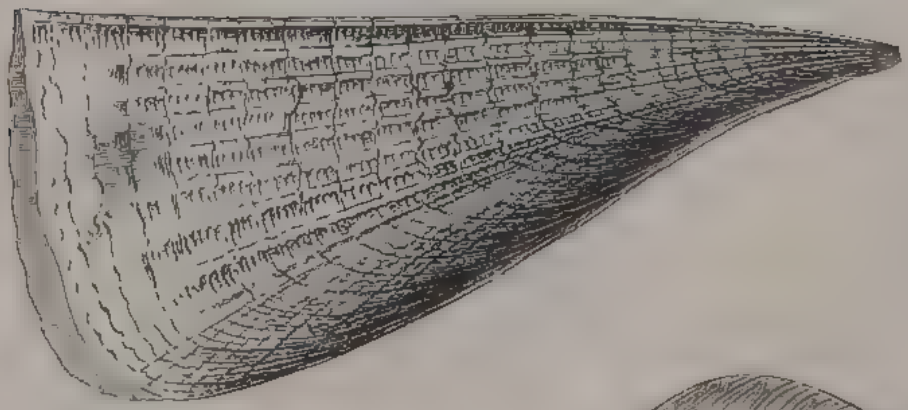
Common Muscle.



Pearl bearing Muscle.



Great Sea Wing



Glassy Terebratula.

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taken, and where their habits cannot come under the observation of naturalists: but very little is consequently known respecting them. In a fossil state they occur in great quantities. Linneus thought they resembled the preceding genus *Anomia*, and classed them in that family. The valves of the shell are equilateral, the under one being the smaller. The character of the upper shell is peculiar, in having its top more or less drawn out into a kind of hook. This hook is channelled with a furrow, the edges of which, uniting at the end, form there a hole; whence this family are named *Terebratulæ*, from the Latin word *terebratus*, pierced. The species engraved is *Terebratula vitrea*, or glassy and brittle.

15. MYTILUS, Muscle. The example is *Mytilus edulis*, or the eatable Muscle. This shell

is comparatively rough. A silky beard attaches it to rocks, corallines, &c. Muscles are eaten as food by men and animals; birds take them, and monkeys cunningly entrap them. When the sea ebbs, Muscles are frequently left on the shores, rocks, and sands: monkeys watch the Muscles as the tide retires, and if one should open its shell to imbibe or reject water, the monkey cautiously approaches and slips a stone between the valves of its shell, which secures the fish, by preventing the creature from closing them.

16. UNIO MARGARITIFERA, the Pearl-bearing Muscle. It is from these shells, found in the rivers and lakes of Europe, and in our country on the Welsh coast and other parts, that many valuable pearls are obtained, called *Union pearls;* indeed, so early as the time of Julius

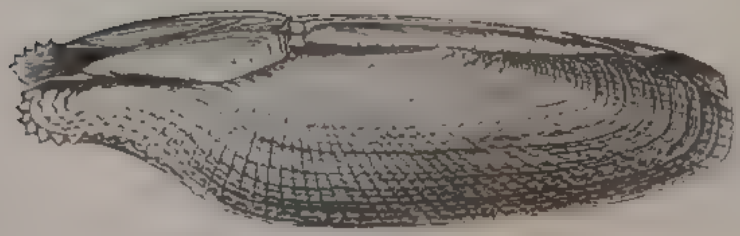
Cæsar the shores of England were famed for pearls, and the desire to obtain them may have been one of the motives which induced this Roman to visit England. Pearls are the product of disease, occasioned by injuries which the shells sustain from blows; consequently, regularity of form is of rare occurrence, and a string of pearls of uniform beauty is likely to remain of great value so long as they are worn as costly ornaments. The pearls found by divers in the Indian seas are taken from shells of a different kind. In another part of the volume we have given some account of the pearl-fishery. The name *Unio,* is from the Latin *unus,* one. Many pearls are found in one shell, but not any two alike as to figure.

17. PINNA, Sea-wing. This shell is broad at one end, and gradually tapering at the

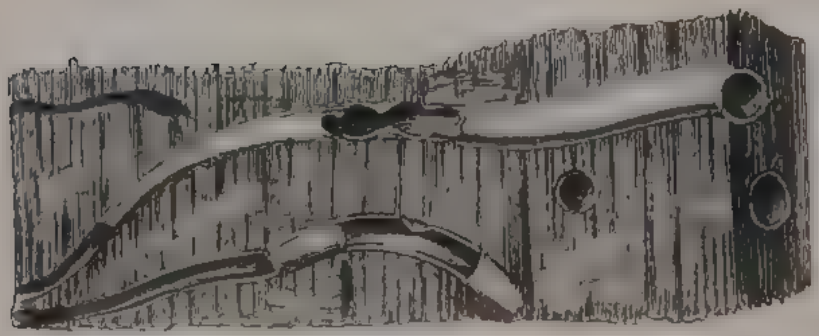
other. The byssus of this animal is as soft and fine as silk; many articles have been manufactured from the threads of the Sea-wing. Many of these creatures must be obtained to afford sufficient material to make a pair of gloves, and therefore the cost precludes the general use of such an article in the manufacture of wearing apparel. A pair of stockings made of the byssus of the Sea-wing was presented to one of the Popes of Rome, and so fine as to be contained in a snuff-box. The British Museum contains specimens of this manufacture. *Pinna ingens*, or Great Sea-wing, is found on the Scottish shores.

Scaly Chiton

Duck Barnacle



Prickly Stone Borer



The Borer or Ship Worm.

Parts of the Head shewing the boring Apparatus

MULTIVALVES.

1. CHITON, Coat of Mail. The form of this shell is oval, and it has usually eight valves, placed one over the other like tiles, but assuming a convex form, and surrounded by a border: the general appearance is not unlike a shield. The example is *Chiton squamosus*, the Scaly Chiton. Some writers refer to the wood-louse as resembling it, and more especially as the Chiton rolls itself up in the same manner as that insect. They adhere to rocks like patellæ, and can move from their situation when they please.

2. LEPAS, Barnacle or Acorn-shell. The ngraving represents a species of this genus, *Lepas anatifera*, or Duck Barnacle. These

creatures are furnished with a peduncle, or hollow stalk, by which they fix themselves to rocks, frequently in large bunches or groups; and are enabled to protrude their *tentacula*, or arms, above the surface of the water in search of food. It is probable this genus has been named *Lepas* from the Greek word for a rock.

3. PHOLAS, Stone-piercer. *Pholas* is a term adopted from the Greek language, signifying a dweller in a cave. The Pholas, when young, possesses the power of piercing wood, fragments of rock, chalk, and stone, and of enlarging its habitation from time to time to suit its growth. The mode in which the Pholas performs this task has not been ascertained, although it is presumed to accomplish its object by the circular motion of its shell. The Pholas is said to emit a phosphorescent liquor,

illuminating the objects it touches. The species given in the engraving is the Prickly Stone-piercer, *Pholas dactylus*.

4. TEREDO, Borer. This genus takes its name from a Greek word signifying to bore. The formation of the Teredo is very curious, and admirably adapted to its nature, which prompts it to perforate wood. *Teredo navalis*, or Ship Worm, is a formidable enemy to the mariner, by boring holes in his ship, unless it is protected by coatings of tar or copper. Vessels have been known to spring leaks from the attacks of the Ship Worm. Dutchmen view this little creature as their great enemy, from its formidable labours among their dykes; their vigilance is constantly required to repair the mischief occasioned in this way. Mankind, nevertheless, derive in some degree

a benefit from this apparently mischievous propensity of the *Teredo navalis:* wrecks of vessels, planks of wood, and decaying vegetable substances, accumulate at the mouths of rivers, and would certainly impede the navigation eventually, if not removed by the assistance of the Teredo, which assiduously bores holes in such substances, until by repeated perforations they yield to the effects and strength of the currents, and are by them carried away. The important apparatus by which this good is effected by the Teredo, it is not possible clearly to describe; but it is said to be by means of a thick muscle passing from one valve to the other, giving motion to its shell, and causing it to turn in the wood like a gimlet.

CHAPTER IX.

We find that Nature has taken less pains in embellishing those of her works which are important for the service of man, than others which, if not noxious, are not calculated for his use. The shell-*fish*, as they are called, which form any part of our food, are, for the most part, plain in colours, and rough, or far from pleasing in form. Crabs, lobsters, shrimps, oysters, and muscles, constitute a supply altogether of great value and estimation in the bill of fare of man; but these are not decked with rainbow hues, and boast no highly-finished dwellings, but they are not the less deserving of our attention.

CRABS live chiefly in the sea. They feed voraciously on marine plants, small fish, and dead bodies. The common *Black-clawed Crab* is remarkable for changing its shell and renewing broken claws. When he is about to cast his case, which he does once a year, the crab retires to some rocky seclusion, and there abides until his old suit of armour is exchanged for the new. During this time, a period of some days, the animal is feeble and defenceless, and seems perfectly aware that the less he shows himself the safer it is for him.

When the claw of a crab is bruised, it bleeds, and the animal seems to experience much pain. For a while it moves it from side to side, then holding it perfectly steady, the claw on a sudden gives a gentle crack, and the wounded part drops off, as if detached by the most skilful surgical operation.

The *Hermit Crab* has no shell of its own to any part but its claws or nippers. But it is gifted with the singular sagacity of finding and appropriating the left-off shells of other species. This would seem incredible if it were not a well-ascertained fact. It is curious in some countries to see this animal busily parading the sea-shore, dragging its old incommodious habitation, the choice of a former year, at its tail, unwilling to part with its inconvenient appendage, till it is assured of possessing a better. It stops first at one shell, then at another, views each for a while, and, slipping off its old armour, tries on the new, until it finds one altogether commodious and fitting. To this it adheres, though sometimes so large as to hide its claws, as well as its body. It frequently happens, however, that there is a disputed

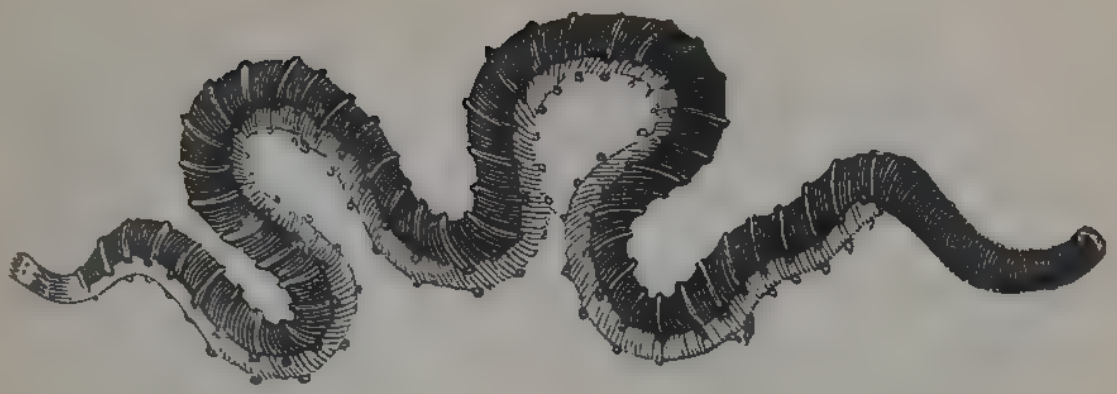
title amongst two or more crabs who may fix on the same shell; in which case, as with men, the weakest powers, not the worst claims, are usually obliged to yield.

LOBSTERS abound on our own shores, and are frequently caught by hand. Traps are also set, which, like those for mice, are made to allow entrance, but not departure. It is an astonishing fact, that lobsters not only change their shells, but likewise their stomachs and intestines. The process, however, is a gradual one.

The claws of crabs and lobsters are very powerful, and it is dangerous to be seized by them. The fishermen sometimes are *caught* whilst they are *catching* these animals, and can never disengage themselves without pulling the claw from the creature.

In the water, lobsters run nimbly; if alarmed, they can spring to a surprising distance, and will direct their course with perfect accuracy to a fissure in the rock only large enough to admit their bodies. Lobsters are very apt to lose their claws through the alarm occasioned by thunder, or the discharge of cannon: they grow again, but not to the former size. Whenever the claws become injured, the animal rids himself of them with prompt dispatch. I know not that we have anything more singular in the history of nature than these authenticated facts relating to crabs and lobsters.

PRAWNS AND SHRIMPS very much resemble lobsters in form. They are found in great abundance amongst the sea-weed, at a little distance from shore. They usually swim on their backs, but when in danger they throw themselves on one side and spring backward a great way. They feed on all the smaller kinds of marine animals, and are in turn devoured themselves by millions.



Amongst the creatures called worms of the sea, there is one named the *Long Sea-worm*, which is the most wonderful animal of the kind known. Such is the length of this extraordinary worm, that it is almost impossible to assign its limits. It is said to measure thirty yards or more, its thickness being between that of a quill and a finger. They are often brought up with fish from the sea; and the sailors affirm that they have hauled them in repeatedly like a rope, without finding the extremity. They are sometimes found under

stones at low water, but always coiled up in the most complicated form. They have the power thus of contracting themselves in a truly wonderful and unexplained manner. These sea-worms are common on the coast of Cornwall.

There are several species of marine worms which emit light from their bodies, and cause probably much of that luminous appearance which the ocean, as we have before mentioned, presents at times. The *Night-shining Nereis* is a slender worm, scarcely visible to the naked eye. It is transparent, and of a watery greenish hue. Myriads of them may be contained in a cup of sea-water, and they invest the scales of many fishes, and give them a radiant appearance.

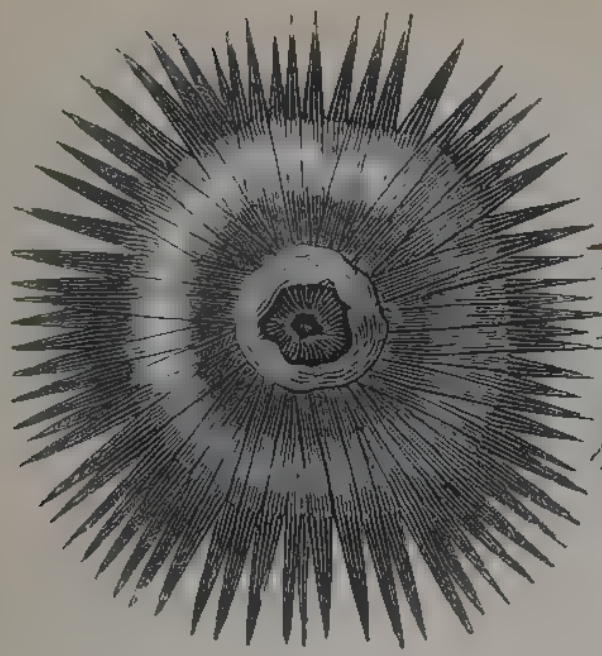


Fig. 1.

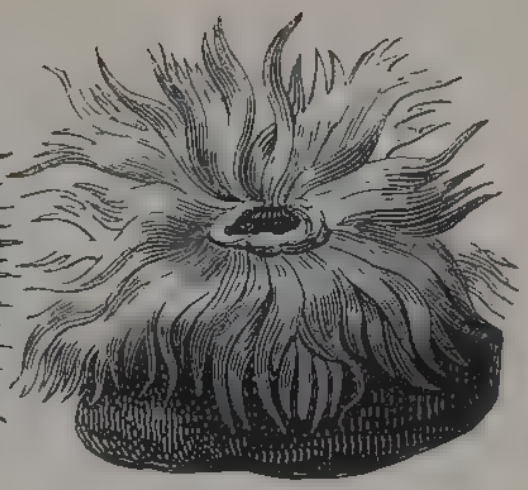


Fig. 2.

Some animals of the ocean have so much the appearance of vegetable substances, that they have even been mistaken for such, and not a few have received the names of flowers: thus there are *Sea-Anemones,* and *Sea-Marigolds,* which are indeed highly beautiful and curious productions. The *rose-coloured sea-anemone* (fig. 1.) has a body shaped like a hollow cone, having an orifice at the top, through which it thrusts many slender arms, radiating, and in

the form of a flower. With these curious limbs, this creature grasps its food, consisting of small shell-fish, with much eagerness and force.

The Sea-Marigold (fig. 2.) nearly resembles in appearance the flower from which it is named. At the depth of one or two feet under water, within a kind of cone in a rock, we are informed that they have been seen, appearing like finely-radiated flowers of a pale yellow, slightly tinged with green. The whole reminded the spectator of a circular border of thickly-set petals, about the size of the garden marigold. The gentleman who saw and described them says, that he often attempted to pluck one of them from the rock, but could never accomplish it; for as soon as his fingers arrived within a few inches, the object in view immediately contracted, and shrank into the

hole in the rock; but, if left undisturbed a few minutes, it would come again gradually into sight, cautiously expanding till it reappeared, as it were, in full bloom. From the centre of the apparent flower proceeded four dark-coloured threads, like the legs of a spider. These were its arms, or feelers, and they had a quick motion from side to side.

And now shall we say that we have concluded our account of the living wonders of the deep—those which actually inhabit the waters of the sea? Shall we say so, when a single drop of sea-water placed under a microscope, would exhibit creatures as numerous, as various, as curiously and perfectly formed, and as new to us, perhaps, as any of the tribes already noticed? Yet we must fix some limits, and whilst we have been com-

pelled to pass over many of the larger species, which attract the attention of naturalists in general, it would not be worth while to attempt giving an account of such as are invisible to the naked eye, and of whose qualities and habits we can know nothing. *Marine Animalcula,* therefore, we must leave for the actual inspection of those who may be supplied with a proper instrument for viewing them, and whose minds may have been so far interested in what has been laid before them, as to seek an extension of their knowledge concerning THE WONDERS OF THE DEEP!

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